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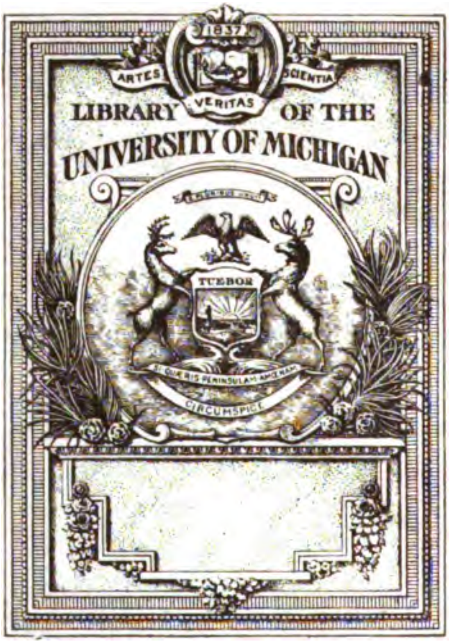

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LONDON JOURNAL
OF
Arts, Sciences, and Manufactures,
AND
REPERTORY
OF
PATENT INVENTIONS.

CONDUCTED BY

MR. W. NEWTON,

OF THE OFFICE FOR PATENTS, CHANCERY LANE.

(Assisted by several Scientific Gentlemen.)

VOL. XXIX.

(CONJOINED SERIES.)

LONDON:

PUBLISHED BY W. NEWTON, AT THE OFFICE FOR PATENTS, 66, CHANCERY
LANE, AND MANCHESTER; SHERWOOD, GILBERT, AND PIPER, PATER-NOSTER ROW; SIMPKIN AND MARSHALL, STATIONERS' COURT; AND
GALIGNANI'S LIBRARY, RUE VIVIENNE, PARIS.

1846.

R. FOLKARD, PRINTER, DEVONSHIRE STREET,
QUEEN SQUARE.

LIST OF PLATES IN VOL. XXIX.

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CONJOINED SERIES.

No. CLXXVI.

RECENT PATENTS.

To Charles Henry Collins, *of Lambeth, in the county of Surrey, engineer, for his invention of improvements on atmospheric railways.*—[Sealed 31st October, 1845.]

This invention of improvements on atmospheric railways consists in a new and improved method, or new or improved methods, of connecting the piston, belonging to the traction tube of atmospheric railways, to the carriages to be moved or propelled on the said railways.

In Plate I., fig. 1., represents a longitudinal vertical section of part of a traction pipe, constructed on one of the improved plans. A, is the main or traction-pipe laid between the rails in the usual manner; and in place of a continuous longitudinal groove, or valve, being made along the top, as is ordinarily the case, the traction-pipe is furnished with a series of longitudinal slots along the top; that is to say, a longitudinal slot of a certain length is first made, then a part of the tube is left whole for an equal length; another slot of the same length as the former is then formed, and so on; alternate equal portions of the pipe being slotted, and left whole along its entire length. These slots the patentee makes about 25 feet long, more or less, and covers them with a box B, which is placed bottom upwards, and bolted, air-tight, to the top of the pipe. The boxes terminate at each end, both internally and externally, in an incline or slope, which brings their ends gradually down to the inside and outside of the pipe, respectively, as shewn in the drawing. Through the inclined ends of the box B, (fig. 1,) rectangular apertures are made, in a line parallel with the length of the pipe, which apertures are closed by the valves C. D, is the piston, to which is attached the stage or platform E, of a greater length than the length of the box B, and, consequently, when immediately under the box, the ends of the platform extend beyond the termination of the box, or the slot which the box covers. The platform is supported inside the pipe, and in a line parallel with its length, by the false piston M, the wheels P, and by the piston or head to which the said platform is attached. H, are sockets, provided with a square slot or hole, and screwed down to the stage E; the two end sockets are further apart than the extreme length of the box B, say 30 feet, more or less, and in the slots of all the sockets forks or Y's F, slide freely. G, are friction-wheels, mounted on pins situated at the upper ends of the forks or Y's F, for the purpose of preventing the said forks from touching the top of the box or pipe. The Y's F, are attached at their lower end to a horizontal rod I, which is pressed upwards by the spiral springs in the boxes acting against a stud or button at the upper end of the short rods *i*, *i*, at the extremities of the horizontal rod I. L, is a rod or bar of iron, which is called the driving rod; it is furnished with sets of notches T, into which the upper ends of the Y's F, fit, in such a manner, that when one fork or Y is in gear, they are all opposite their respective notches in the driving-rod, and will immediately gear into the said notches when not prevented by other parts of the apparatus.

A bar O, is attached to the carriage to be propelled, and is situated exactly over the centre of the pipe. This bar O, is also furnished with forks or Y's F^1, similar to the Y's F, of the platform or stage E, inside the traction pipe; and notches T^1, are made in the driving rod L, into which the Y's F^1, of the carriage-bar O, gear, in the same way as the Y's of the platform E; the distance between the two end Y's F¹, being greater than the length of the box B, say 30 feet, more or less, so as to act in connection with the set inside the tube. The Y's F, and F¹, being pressed upwards and downwards, respectively, by the springs K, and K¹, it will be seen, that in passing through the pipe, one at least of the Y's of each set will always be in gear with the driving-rod L; the first one being always in gear before the last quits its hold. When the wheels G, or G¹, of the Y's arrive at the inclined mouth of the box B, at C, the springs K, will be compressed, and the wheels G, or G¹, run up or down, as the case may be, whether they are outside or inside of the pipe, and, by this means, cause the upper ends of the forks F, to leave their hold of the driving-rod L, as shewn in fig. 1.

Fig. 2, is a transverse vertical section through the pipe A, and box B, shewing the Y or fork in gear with, or laying hold of, the driving-rod L. Fig. 3, represents the fork or Y F¹, belonging to the carriage, in gear with, or laying hold of, the driving-rod L, as would be the case at the plain parts of the traction tube. Fig. 4, is a transverse section of the pipe, taken through the valve. C, is the valve, placed at the end of a frame *b*, which carries a horizontal wheel *a*;—the frame *b*, terminates in a rod, which slides in the guide C¹, made in the upper end of a bracket, as shewn in the drawing. The means by which this valve is opened, is shewn in fig. 5, which represents a plan view of the pipe and box. A bar R, is attached to the frame O, of the carriage, just in advance of the driving-rod, as seen at fig 1, and is fixed obliquely, or at a proper angle to the line; so that, in its passage, it will open the valve, by pressing against and forcing back the horizontal wheel *a*, as shewn by dots in fig. 5. A similar bar R¹, fixed at an angle to the opposite end of the carriage, behind the driving-rod, as seen at fig. 1, closes the valve, by coming into contact with, and forcing back the wheel *a*; and thus the pipe is made air-tight, and ready for the next train.

Fig. 6, is a longitudinal vertical section, and fig. 7, a transverse vertical section of the piston, shewing the manner of preventing the passage of the air through the box B, during the passage of the piston. The piston is, in fact, a double piston; that is to say, two pistons are mounted on the same shaft, one behind the other, a short distance apart, and separated by a horizontal cylinder. These single pistons are formed of cup-leathers, in the usual way, adapted for the pistons of the traction tubes of atmospheric railways. Between the two single pistons is a hollow cylinder, of nearly the diameter of the pipe, and having a slot cut out of the same, throughout its whole length, of the same width as, and immediately below, the opening in the box B, to allow of the spring S, passing up through the opening into the box B, for the purpose of closing the same. On either side of the slot, so cut out of the cylinder, a slip of leather, which reaches from one cup-leather to the other, is rivetted, and prevents the passage of any air between the side of the cylinder and the traction-pipe; and the spring S, by rising up and bearing against the upper side of this box B, as seen in fig. 6, prevents the air from passing through the box B, to the front of the piston. On the upper side of the spring S, a piece of leather is rivetted, of the full width of the box B, for more effectually preventing the passage of any air past the spring.

Fig. 8, represents, in transverse vertical section, and fig. 9, in plan view, a method of supporting the driving-rod L, independent of the Y's or forks. *e*, is a wheel, turning on a centre, fixed to the rod *h*, which slides in an arm projecting from the carriage, and is pressed out by a spring, so as to be under the driving-rod L, and thus support it. This method of supporting the rod L, requires a guide at the bottom of the incline of the box B, as shewn in fig. 9.

Fig. 10, is a sectional representation, and fig. 11, a side elevation of another method of supporting the driving-rod L, also independent of the forks or Y's. *f*, *f*, are small bars, which are pressed down by spiral springs contained in the sockets *g*. These sockets are fixed at an angle to the carriage; and the bars *f*, being pressed down, pass obliquely into notches made in the driving-rod, and thus support it. On coming to the commencement of the box B, the bevil-wheels I, I, attached to *f*, run up an incline placed there for that purpose, and by pressing the springs upwards release the bars *f*, from the notches in the driving-rod L, and allow the latter to proceed onwards. The inventor prefers having four pairs of these supports fixed to the carriage.

Fig. 12, shews the manner in which the carriage is detached from the piston, at the termination of the pipe. At the extremity of the pipe a long piece of sheet-iron *m*, in width about two-thirds of the diameter of the pipe, is held parallel with the top of the pipe by the supports *n*; and as the piston passes under the cover *m*, the Y's F, belonging to the piston frame, are prevented from gearing into, or laying hold of the driving-rod L, which is carried by the carriage over the cover *m*, and passes through an aperture at *p*. Figs. 13, 14, 15, and 16, are transverse sections of fig. 12, through the dotted lines opposite to which they are placed. Another method of detaching the carriage from the piston consists in a prolongation of the box B, beyond the pipe, for about the length of the piston and the stage to which it is connected; the box being supported in a similar manner to the iron cover last described. The piston and driving-rod will then run into the box and come to a stop; while the carriage, by the momentum it has acquired, will proceed onwards for some distance, and can be readily stopped at its destination by means of brakes, in the ordinary manner. The carriage forks or Y's, and friction-wheels G^1, may be made to run on a ledge or rail, cast on the pipe and box, as shewn in figs. 12, 13, and 14; and as the wheels G^1, are furnished with flanges, they will always be kept exactly over the driving-rod L.

Fig. 17, is a longitudinal vertical section, and figs. 18, and 19, transverse vertical sections of the traction-pipe, in which a different arrangement or construction of parts to that above described is shewn. By this modification, the connection of the carriage outside the tube with the piston inside the tube, is effected without the aid of the springs K, K, as employed in the plan above described at fig. 1. A, A, figs. 17, 18, and 19, is the traction-pipe, having a narrow longitudinal slot or groove along its whole length; this slot is made in a perfectly straight line along the top of the pipe, and is covered by the box B, which is bolted, air-tight, to the pipe. The box B, is placed for a certain distance, say 25 feet (more or less), so as to leave a greater area on one side of the slot in the pipe than on the other; and then, for an equal distance, it is placed so as to have a greater area on the other side of the pipe; and so on, alternately, as shewn in figs. 20, and 23. By referring to these figures it will be seen, as has been before said, that the longitudinal slot Z, is made quite straight along the top or upper side of the tube, and that the box or cover B, is, at every 25 feet, (more or less) bent out of a straight line, so that the box is first placed a little over the right side of the slot; then, by being curved towards the left, it is placed a little over the left side, and after continuing so for the same length, say 25 feet, it is bent or curved back again to the right side, and so on alternately; but the longitudinal slot is always covered over by the box, so as to prevent the admission of air, except at proper times, and through the small valves made for that purpose. In fig. 20, the internal form of the box, at the point where it is bent out of a straight line, is clearly shewn, and its external form is represented by dots. In fig. 17, D, D, is the piston, attached to one end of a stage E, which is supported by the wheels P, M, and carries brackets or supports H, H; the extreme or two end brackets being fixed at a greater distance from each other than one of the straight lengths of box B, say 30 feet, more or less; the upper end of these brackets pass up through the longitudinal slot in the traction-pipe, and are furnished with sockets, in which the forks or Y's F, work, and allow of the Y's F, sliding freely in them. The Y's F, are furnished with friction-wheels G, which prevent them from touching or rubbing against the sides of the box B. L, is the driving-rod, being similar, in all respects, to that previously described, and having notches T, and T^1, into which the ends of the Y's F, are inserted. Brackets H^1, (see figs. 18, and 19), furnished with sockets, are firmly bolted to the under side of the carriage; and in these sockets a bent bar X, is placed, in such a manner as to admit of the bent bar sliding freely backwards and forwards. The ends of the bent bar X, carry the friction-wheels G^1, the axis of one of which passes through and is fixed to the Y's F^1, as shewn in the drawing at figs. 18, and 19; so that, as the bent bar X, and its rollers G^1, are slidden to and fro in the socket H¹, the roller G¹, carries the Y F¹, with it; and in order to give greater stability to the Y F¹, and cause it to move with greater ease and regularity, it is supported and slides in an arm or bracket Y, attached to the carriage.

The wheels G¹, are furnished with a flange, and are guided in their course by a ledge or rail cast along the top of the box B. In that part of the box B, which is deflected or bent out of a straight line, the valve C, of a similar construction to that previously described, is placed; the valve has a small projecting rib made on its upper end, which, by sliding in the guide *d*, (see fig. 21,) keeps the valve in an upright position, when it is opened or shut, as will be understood by the following description:—To the upper part and on one side of the valve is fixed the friction-wheel *a*; and R, is an inclined bar, attached to the carriage just in advance of the driving-rod L, as seen in fig. 17. The bar R, on coming into contact with the under side of the roller or wheel *a*, raises it, and thereby opens the valve, and allows the rod to enter or pass into the box. A similar bar R¹, inclined in the opposite direction, is attached to the end of the carriage, just behind the driving-rod L, which, by coming into contact with and pressing down the wheel *a*, forces down and shuts the valve C, after the rod has passed through.

As it may be necessary sometimes to stop the train of carriages by vitiating or destroying the vacuum in front of the piston, a valve-opening apparatus, shewn by dotted lines in fig. 17, is attached to the carriage in such way as to open the valve ahead of the piston, and thus admit the air. *r*, is a bar, turning on a centre, fixed to the arm X, attached to the carriage, and capable of being raised or depressed by turning the handle *v*, which is mounted on the upper end of the rod *t*; this rod, being provided with a screw at its upper end, is raised or depressed, according as the handle *v*, is turned. A similar contrivance to this may be applied to the arrangement first described.

The operation of the apparatus, shewn in fig. 17, and the figures following, is thus explained:—The boxes B, being fixed to the pipe, and the piston and carriage Y's arranged as herein described, it will be seen that the driving-rod L, will be always in gear or connected with the piston and carriage, and that it passes alternately within and without the box B, as in the first method. The rod L, is supported by the wheel G, within the pipe, and by a plate, which is bolted to the under side of the Y F^1, without the pipe. As shewn in fig. 20, the distance between the two end carriage Y's F^1, must be greater than the length of box on one side of the pipe, say 30 feet, more or less, as in the former instance. The piston is formed of two cup-leathers, in the usual manner, and the piston, for working in the box B, consists of a frame S, (figs. 17, 20, and 22,) formed in a curved shape, so as to pass the turns or curved parts of the box B, with facility. To the sides and top of the frame S, leather is rivetted in such a manner as to make it fit the box B, but still to allow it to move freely therein. Across the frame *s*, horizontal rods *q*, are fixed. These rods slide in the upper ends of upright carrying-pieces or arms *w*, which pass through the pipe-slot, and are bolted to the piston D, as seen in fig. 17. By this arrangement and construction of parts, the box-piston S, is enabled readily to follow the course or curves of the box B.

Fig. 23, represents the extremity of the traction-pipe at the terminus of a railway, and the manner in which the piston and carriage will be detached from one another. We have seen, in the foregoing description, that at every curve of the box the friction-wheels G^1, belonging to the carriage Y's, are, by following the course of the curved rail on the box, forced into or out of gear with the driving-rod L; it will, therefore, be perfectly evident that if, at the end of the pipe, the box B, is made straight for a greater distance than the length of the driving-rod L, the Y's of either the carriage or the piston will be prevented from laying hold of the rod, and the carriage must therefore stop.

Figs. 24, and 25, represent different modes of forming the driving-rod L, and forks or Y's F.—B, fig. 24, is a square or round rod, flattened at the notch, which is cut, as shewn in the drawing. A, is a fork or Y, to correspond to the driving-rod B, in fig. 25. The driving-rod B, is formed by rivetting transverse bars to two longitudinal ones, like a ladder; by which means a light but strong and rigid rod will be formed;

the fork or Y will then merely consist of a square peg or pin, fitting into one of the spaces, and rounded so as to enter more freely. At its ends the driving-rod is preferred to be pointed.

Figs. 26, and 27, represent different modes of constructing the slide-valve. At fig. 26, the valve C, is a plate of metal, having a square hole D, of the size of the internal area of the box; over this, a plate of lead *d*, is soldered or otherwise fixed, as in the event of the valves, by any mischance, not opening at the proper time, the driving-rod will pass harmlessly through the lead, which may be easily renewed. A piece of leather is strained round the valve C, to make it fit air-tight to the seat on which it slides, but so as to allow it to move freely. The leather is rivetted, as shewn in the drawing.

In fig. 27, the valve C, is a plate of metal similar to the last, but having the hole open and small springs *c*, at the corners of the plate. C^2, is a similar plate, having a square hole fitted with lead, as before described, and being truly ground; two pins projecting from it fit into corresponding holes in the other plate C; the two plates being then placed together, as shewn, the plate C^2, will be pressed by the springs against the side of the valve-seat, which should be likewise ground perfectly true. An air-tight valve will thus be formed without the aid of packing.

The patentee claims the method or methods, above described, of connecting the piston of the traction-tube of atmospheric railways to the carriage outside. He claims, particularly, the use of forks, Y's, pins, studs, grips, pincers, or other equivalent parts, attached to or connected with the piston and carriage, and causing the same to lay hold of a driving-rod, or take into notches or holes, or on to studs or projections, formed in or on the same, for the purpose of establishing a connection between the piston inside and the carriage outside the tube. He also claims the application of slide-valves, as shewn, to close the apertures of the box on the tubes of atmospheric railways.—[*Inrolled in the Petty Bag Office, April,* 1846.]

Specification drawn by Messrs. Newton and Son.

To WILLIAM COLES FULLER, *of Brownlow-street, in the parish of St. Andrew, Holborn, and county of Middlesex, cabinet-maker, for his invention of improvements in the construction of carriages for railways.*—[Sealed 23rd October, 1845.]

THIS invention of improvements in the construction of carriages for railways, relates to an improved method or methods of constructing railway carriages, and the springs and buffers to be adapted thereto, whereby the dangerous consequences of collisions may be, in a great measure, prevented, or considerably lessened, and greater ease and security obtained.

The improvements consist, firstly, in placing a cushion, with or without springs, at each end of a railway-carriage; the cushions being of such proportions as to cover the whole or the greater part of the ends of the carriage; so that, in case of a collision, the security of the passengers may be ensured.

The second part of the invention consists in the application of buffer and other springs of India-rubber or caoutchouc, in manner hereinafter described, for the purpose of promoting the ease and comfort of the passengers.

The mode in which the cushions may be applied to the ends of a railway-carriage, not provided with the ordinary buffer, is shewn in Plate II. Fig. 1, represents a longitudinal section of parts of two railway-carriges. *a, a,* are moveable cushions, adapted to the ends *b, b,* of the carriages. These cushions are made on strong wooden or metal frames, and are placed at a short distance from the ends of the carriages, which must also be made of extra strength; and strong springs are placed between the cushions and the ends of the carriages, with which the cushions are connected by sliding rods *c, c.* These rods pass through sockets in the end-framing of the carriages, as seen in the drawing. The cushions are stuffed with wool, cocoa-nut fibre, India-rubber, or other suitable elastic material, and are covered over with leather, strong canvas, India-rubber, or other suitable material. Any required degree of rigidity or elasticity may be given to the cushions and their appendages by the employment of additional springs. For instance,—metallic or other springs may be placed between the back of each cushion and the end of the carriage; and the India-rubber springs, hereafter described, may be adapted to the sliding rods *c, c,* as shewn at *d, d;* and, in addition, the inner ends of these rods may be made to act against metallic or other springs, for the purpose of obtaining additional resistance. As the sliding rods *c, c,* run through holes in the top framing of the carriage, as well as the bottom framing, springs must be adapted to that part also. The carriages are connected together in such a manner as to bring the surfaces of the two opposite cushions into contact in the same way as the buffers heretofore used.

The manner of applying the cushions to the ends of a railway-carriage, when ordinary or other buffers are also intended to be used, is shewn at fig. 2, which represents a longitudinal section of parts of two railway-carriages, having buffers of the ordinary description.

The cushions *a, a,* attached to the ends of the carriages, are of the same description as those already described as parts of fig, 1, and they are firmly secured to the ends of the carriages, but without any springs being placed between the cushions and the carriages, as shewn at fig. 1.

The second part of the invention consists in applying India-rubber or caoutchouc springs to ordinary or other buffers, and also employing them to support the bodies of railway-carriages. The application of the India-rubber springs to ordinary railway carriage-buffers is shewn at figs. 3, and 4. Fig. 3, represents, in longitudinal section, part of two railway-carriages, with their ends placed together, and having parts of the framing removed, so as to shew the India-rubber springs, and the application thereof to buffers. In place of the ordinary buffer-springs, the patentee employs circular discs or rings of India-rubber *e, e,* of about five inches in diameter, and from half an inch to three inches in thickness, according to circumstances and the situation of the spring. These discs or rings are placed upon the circular rods or shafts *c, c,* of the buffers, with a thin disc or circular plate of tinned iron, galvanized iron, or other similar material *f, f,* placed between them as a support; so that every ring of India-rubber *e, e,* will be situated between two iron or other discs *f, f.* These India-rubber buffer-springs may either be placed inside the framings, as shewn at fig. 3, and covered with boxes or covers, or they may be placed between the buffer-heads and the end framings of the carriages, as shewn at fig. 4.

When the India-rubber discs *e, e,* are placed under the carriage, as shewn at fig. 3, (which is perhaps the more preferable mode of the two), they should be made of less diameter than when placed outside; and a stop *g,* is made on or attached to the sliding rod of the buffer, which, when the buffer of one carriage comes into contact with or strikes against the buffer of an adjoining one, it compresses the India-rubber rings *e, e,* laterally, against the stationary piece *h,* of the framing. It will be seen, that the thin iron discs *f, f,* are of greater diameter than the India-rubber discs *e, e*; and as these latter are compressed laterally, their diameter is increased in proportion. It should be understood that, as the sliding rods *c, c,* pass freely through holes made in the centre of the India-rubber discs *e, e,* and metal discs *f, f,* the India-rubber, after being compressed laterally thereon, as above-mentioned, is left perfectly free to expand to its original thickness, which it will do immediately the pressure is removed; and, in order to assist this regular compression and expansion of the India-rubber discs, and prevent them from binding round the sliding rods, which would have the effect of preventing them from expanding regularly and properly, the thin iron discs are placed between the India-rubber discs, and the holes in these latter are made of greater diameter than the diameter of the sliding rods. In order still further to assist in keeping the India-rubber discs in their proper places, small holes, with rough edges or projections, are made in the metal discs *f, f,* which, by holding on to the India-rubber discs, will be sufficient to keep them from slipping down out of their places, and binding on the rods *c, c.* The patentee, in some cases, proposes to furnish the iron discs *f,* with a conical collar or boss, which, by fitting into the next adjoining collar, will allow the India-rubber discs *e, e,* to be compressed, and effectually prevent them from binding on or coming into contact with the rods *c, c.* Fig. 4, is merely a modification of fig. 3; the India-rubber discs being placed between the buffer-heads and the end framings instead of inside the framings. This plan may be used in conjunction with the preceding one, if thought desirable; or either or both may be employed with ordinary steel buffer springs, if required.

It is to be observed that the discs of India-rubber employed in the construction of the improved buffer-springs are to be made of a proper diameter, according to their situation on the carriage; so that when the springs are compressed, the discs may have sufficient room to expand; and the thickness of the discs must be according to the degree of elasticity or rigidity required to be given to the springs. If it is desired that a buffer shall possess greater power or rigidity, that object may be attained by applying to it two or more sets of springs.

The application of the India-rubber springs for supporting the bodies of railway-carriages is shewn at fig. 5, which is an elevation, partly in section, of a railway-carriage. *i, i,* is an oblong box, firmly secured to a framing resting on the axle-boxes, and furnished with a rack, consisting of a number of strong horizontal teeth *o, o,* projecting upwards, and extending across the box from side to side; and *j, j,* is a second box and rack, attached to the suspended body of the carriage, and furnished, on its under side, with a number of teeth *k, k, k,* projecting downwards; and at each end of this framing *j, j,* guide-rods may be made to pass through holes or sockets, made in the lower framing, for the purpose of keeping the carriage-body in its proper position. A long thick rib or strap *p,* of India-rubber, is laid along the top of the horizontal teeth *o, o,* of the rack in the lower box; and both ends of this rib or strap of India-rubber are firmly secured to the box. It will now be seen, that when the teeth *k, k,* of the framing *j, j,* press on to the India-rubber rib or strap *p,* they will force it down between the teeth *o, o*; and these teeth *k,* and *o,* being arranged at equal distances apart, and so that they shall protrude in the spaces of the opposite set, the

India-rubber will form a bed for the teeth *k, k,* and prevent the framing *j,* from descending too far; and thus, by its elasticity, form a spring for suspending the body of the carriage.

In place of using teeth, as above described, either the upper or lower box may be constructed with bars or pins, for the purpose of resting upon or supporting the India-rubber. The strength or rigidity of the spring will depend upon the closeness of the teeth *o, o,* to each other, and the thickness of the rib or strap of India-rubber; and the tension of the India-rubber strap is to be regulated by the screw *s*; so that, when the carriage is fully laden, there will be sufficient space left for the action of the spring.

At figs. 2, and 6, other modes of constructing carriage-springs of India-rubber are shewn. *a, a,* is part of the carriage-framing, as shewn in fig. 5; and *q, q,* is a plate or block of wood or iron, to which the axle-box *r,* is attached; this plate *q,* is connected to the framing *a, a,* fig. 2, by metallic sliding rods *l, l,* which pass through holes made in the framing, and allow the plate *q,* to move up and down as the layers of India-rubber yield to the weight of the carriage. In place of the metallic sliding rods, above described, the layers of India-rubber may be fastened together by passing cords or pieces of India-rubber through them, as shewn at fig. 6; and it is to be observed, that India-rubber springs, for supporting carriage-bodies in this manner, may be formed entirely of one piece, and either square, round, or of any other convenient shape.

The patentee observes, that as ordinary India-rubber is liable to be affected by changes of temperature, and to become hard or rigid by exposure to cold, he prefers using India-rubber or caoutchouc prepared in the manner described in the specification of a patent granted to Thomas Hancock on the 21st day of November, 1843,—as caoutchouc, thus prepared, is not liable to be acted upon by any ordinary temperature to which it may be exposed.

He claims, Firstly,—the application of cushions, with or without springs, to the ends of railway-carriages, as hereinbefore described; and, Secondly,—the India-rubber buffer-springs, and India-rubber springs for supporting railway carriage-bodies, as hereinbefore shewn and described.—[*Inrolled in the Petty Bag Office, April,* 1846.]

Specification drawn by Messrs. Newton and Son.

To Thomas Worsdell, Jun., *late of Stratford, in the county of Essex, but now of Birmingham, in the county of Warwick, railway-carriage builder, for certain improvements in apparatus to be attached to, and employed in connection with, railway-carriages.*—Sealed 23rd October, 1845.]

This invention consists, in the first place, in an improved construction of apparatus to be applied to railway carriages, for protecting the passengers from injury in case of collision; and, secondly, in an improved construction of jack for lifting heavy bodies, and particularly railway carriages and engines.

In Plate II., the improved apparatus for protecting passengers is shewn, as applied to a railway-carriage. It consists of a padded shield, placed across the front end of the carriage, and so mounted, that in case of a collision, it shall fly up and cover the glass in the front part of the carriage. Fig. 1, is a vertical section of a carriage, shewing also the padded shield and apparatus belonging thereto. Fig. 2, is a cross section, taken in the line 1, 2, of fig. 1; and fig. 3, is a plan view of part of the framing of the carriage, shewing the connection of the buffers with the apparatus for raising the shield. *a,* is a horizontal bar, placed under the carriage, and having forked ends, which embrace the rods *b, b,* of the buffers. In the middle of this bar is a slot or opening, to allow the rod *c,* to pass through it, which rod is intended to connect the carriage with its next adjoining carriage. Immediately below the slot, on the under surface of the bar *a,* a rack *d,* is provided. *e,* is a vertical sliding-rod, forked at its upper end, and shewn detached at figs. 4. *f,* is a pivot, which projects from the framing of the carriage, and is intended to carry the arms *g, g;* the other end of these arms *g,* is provided with a pin, which slides in horizontal slots in the bottom of the frame of the shield *h*. *i*, *i*, are vertical rods to guide the shield in its upward and downward course. The lower end of the sliding-rod *e*, is furnished with a rack *k*; and immediately above the rack a slot or opening is made in the rod through which the connecting-rod *c*, passes. *l*, is a quadrant rack, mounted in suitable bearings on the framing of the carriage, and is so placed that its teeth shall be in gear with both the racks *d*, and *k*. In a slot in each of the buffer-rods *b*, *b*, a cotter is driven, the ends of which, projecting out from the periphery of the rod, will, when the buffers are driven in with more than ordinary violence, come in contact with the ends of the horizontal bar *a*. The operation of the apparatus for raising the shield is as follows:—Suppose (as will be the case in a collision) the buffers to be forced in, as shewn by dots at fig. 3, the cotters in the buffer-rods will come against the ends of the bar *a*, and drive it back. This action will cause the quadrant rack, which is in gear with the rack *d*, on the bar *a*, to raise the rod *e*, by means of the rack *k*, on its lower end. The sudden rising of the rod *e*, to the distance allowed by the length of the slot in that rod, will cause the arms *g*, *g*, to start up and force the shield upwards, so that it shall cover the glass in the front of the carriage, and thus interpose a soft padding for the protection of the passengers.

The second part of the invention, viz., an improved construction of jack for moving heavy bodies, is shewn as employed in connection with a railway-carriage. Fig. 5, is a side view of the jack holding a carriage in suspension; fig. 6, is a sectional plan, taken in the line 1, 2, of fig. 5; and fig. 7, is an end view of the same. *a*, is a quadrant or rocking-piece, of cast or wrought-iron, having, in its upper part, a seat or bearing to receive the pivots projecting from a wrought-iron ring *b*. The lower edge of the quadrant *a*, is the segment of a circle, with a few inches of flat surface at each end of the arc, and it is provided with teeth, the better to take hold of the plate or shoe *a**, over which it will travel when intended to move the carriage laterally. On each end of the quadrant sockets are made, to receive the end of levers for moving the jack forward. The sides of these sockets incline inwards, for the purpose of allowing the levers to be placed at an angle, if thought convenient, in using the jack. *c*, is a lifting screw, which passes through the ring *b*, and also through a ratchet-wheel *d*, which is placed immediately above the ring *b*, and has a worm cut on its interior to take into the thread of the screw *c*. To the upper end of this screw a table *e*, is attached, for supporting the carriage or other heavy body to be lifted; and to the lower end of the screw a disc is attached, of a diameter sufficiently large to prevent the ring *b*, from dropping away from the screw, when lifted off the quadrant *a*. The ratchet-wheel *d*, is embraced by the forked arms *f*, which terminate in a pin *g*. *h*, is a piece of metal, which slides on the pin *g*, and carries a click or pawle *i*, for working the ratchet-wheel; it is also provided with a socket (see the detached sectional view, fig. 8,) to receive the end of a lever for working the click and ratchet-wheel. A vertical slot is made through the sliding-piece *h*, and the pin *g*, to receive a key, by means of which the sliding-piece is kept firm in its place. *k*, is a spring for keeping the click or pawle in contact with the teeth of the ratchet-wheel. When a carriage is required to be lifted on to the rails A, A, of a railway, as shewn at fig. 5, the jack is placed under the cross-head of the carriage, and a small bar of iron attached to the table *e*, is laid thereon, in order to incline the screw *c*, a little out of the perpendicular, in the direction in which the carriage is intended to be moved, to prevent the screw being strained. A lever is then applied to the socket of the sliding-piece *h*, to work round the ratchet-wheel, by means of which the screw *c*, is elevated until the table of that screw raises up the carriage to the required height. The lever is then removed, and placed in the socket of the quadrant, as shewn at *l*, fig. 5; and its upper end being depressed, the quadrant will move forward to the position shewn by the dotted lines, when the carriage-wheels will be immediately over the rails. The screw *c*, is now depressed, by knocking out the key in the sliding-piece *h*, and turning it over for the click or pawle to act upon the other side of the ratchet-wheel. The key being then replaced, and the lever again applied, the screw may be depressed until the wheels rest upon the rails. As sockets are provided on each side of the quadrant, two or more levers may be used; and thus, the operation of transferring the carriage from one spot to another will be readily effected. When the jack is not in use, the screw, with its ratchet-wheel, may be lifted off the quadrant, and the apparatus may be packed away in a small compass, for transmission to any other place where it may be required to be employed.

The patentee claims, First,—the improved construction of apparatus, as above described, for raising a shield to protect the passengers in railway-carriages; which apparatus is brought into action when the buffers are driven up with violence. And, with respect to the second head of the invention, he claims the application of the quadrant or segmental rocking-piece to a lifting jack, as above explained, whereby a forward or backward movement is communicated to the jack, when sustaining or carrying a load.—[*Inrolled in the Petty Bag Office, April,* 1846.]

To ALFRED VINCENT NEWTON, *of the Office for Patents,* 66, *Chancery-lane, in the county of Middlesex, mechanical draughtsman, for an invention of certain improvements in machinery for manufacturing metal pipes or tubes,—being a communication.*—[Sealed 26th September, 1845.]

THIS invention consists in a peculiar arrangement of apparatus, whereby leaden pipes may be manufactured with an interior coating of tin at one and the same operation. The object of such manufacture being well known to persons conversant with beer-engines and other machines for raising and forcing fluids, it will be needless to point out the application and utility of such pipes to the industrial arts.

In Plate II., fig. 1, is a longitudinal vertical section of the machinery to be employed for this purpose. The machinery, it will be seen, has many parts in common with that generally used for making continuous lengths of leaden pipe; but to such parts no claim is made, although it is necessary to shew and explain them in connection with the improved arrangement of parts, in order that the nature of the invention may be more clearly understood. The lead pipes are produced in this machine by the employment of hydrostatic pressure; which forces the lead, in a fluid state, around a mandril in a small chamber, between it and a die, and thence drives it through the said die as it chills. This mandril, being hollow, is made to eject fused tin through lateral openings, and thus spread a coating of tin over the surface of the inside of the pipe as it passes out of the machine.

The outer frame-work of the machine consists of two main head-plates of cast-iron, connected together by four rods or bars of wrought-iron, perforating the head-plates at the four corners, and firmly secured thereto by screws and nuts upon the ends of the bars outside the head-plates; each bar having a strong shoulder fitting to the inner face of the plates, as exhibited in fig. 1. A, A^1, represent the head-plates, and B, B, the rods, with the nuts upon their ends. Each of the head-plates has an orifice through the centre, about nine inches in diameter. This frame is placed horizontally upon a solid foundation of stone (or may, for convenience, be placed vertically or diagonally), and is intended to support and sustain two metal cylinders C, and M. The larger cylinder C, constitutes the hydraulic press; it may be made five feet long and thirty-two inches in diameter, with a bore of fourteen inches and a half in diameter. The smaller cylinder M, used for receiving the lead or other metal to be formed into pipes, in proportion to the above size, should be four feet long and two feet in diameter, and have a bore of six inches diameter: this cylinder is made of composition metal.

The head-plate A^1, has a conical recess upon its inner surface, bored to the depth of several inches, into which one end of the cylinder C, is closely fitted. The other end of this cylinder is supported by a strong cross-bar of cast-iron, running from one of the lower main connecting-rods to the other, and having a circular or curved bed for the reception of the cylinder. Another curved cross-bar, passing from one of the upper connecting-rods to the other, secures this end of the cylinder firmly in its place. L, is a steel piston, of six inches in diameter, and made a little smaller than the bore of the lead cylinder M. The head L^1, of this piston is fourteen inches and a half in diameter, corresponding to the bore of the press-cylinder C, and packed to prevent the water from passing it. That end of the piston which enters the small cylinder M, has a piece of metal *m*, attached to it, and forming a head which just fits the bore of the cylinder, and is made of the same kind of metal, in order that, when heated, it may expand equally with the cylinder, and preserve a tight packing: the face of this piece *m*, is concave, and there is a groove turned around its periphery to avoid the necessity of any other packing. E, is a circular plate, four inches thick, and corresponding in diameter to the cylinder C, to which it is securely attached by screws. This plate has an orifice in the centre, six inches in diameter, to allow of the passage of the piston. Packing must be put between this plate and the end of the cylinder, to prevent the escape of the water in returning the piston. The water is forced into the press-cylinder C, through a small copper tube *b*, *b*, connected to the centre of the head-plate. F, is the force-pump, which is regulated by a fly-wheel G, driven by a small steam-engine or other first mover. The lead cylinder M, is placed within the rods before mentioned at the outer end of the machine, and perfectly in line with the press-cylinder. That end of the lead cylinder which is next the press is supported by a cross-piece, in a similar manner to the press-cylinder; but as it has frequently to be taken out, it has no fastening on the upper side. The other end of this cylinder is not placed directly against the head-plate A, but is attached, in the first instance, by means of screws to a large plate H, four inches thick, and considerably larger than the end of the cylinder, called the die-plate. Fig. 2, represents this plate detached from the machine; and fig. 3, shews it in section. It is placed against the head-plate, and sustained by two brackets or sockets, screwed to the head-plate, into which the arms or ears c^1, c^1, fig. 2, are fitted. The plate is further preserved in its place by a circular groove or ring, turned on that face which is intended to fit against the inner surface of the head-plate A; and on this inner surface is a corresponding circular head or projection to fit the groove. A similar groove is also provided on that face of the plate H, which comes against the cylinder M, where a beading is made to fit the groove, and thus an unchanging centre is secured at this end of the machine, as was done at the other end by the insertion of the press-cylinder into the head-plate.

Into the die-plate H, above described, a die I, (shewn detached at fig. 4,) is fitted. This die can be changed, as occasion may require, by unscrewing the die-plate H, from the cylinder M. It is about a foot in diameter, and of the same thickness with the die-plate; and when inserted into that plate, through an orifice for the purpose, the outer side of the die rests against the head-plate A. This die is bored in the centre, on the inner side next the cylinder M, from four to five inches in diameter, to a depth within three-fourths of an inch of the outer side; the orifice is then continued through three inches in diameter only. The die is provided with a flange, about three-quarters of an inch wide on the inner edge, which fits into a corresponding recess in the die-plate H. *c*, is the mandril, which forms the bore of the pipe; and it is held in its position by being screwed into an arm *g*, projecting from the side of the orifice of the die I. To this projection arms are sometimes added, extending to the side of the die. Figs. 6, and 7, give a view of the side of these fixtures, into which the mandril or core is screwed. The precise form of this fixture, for holding the mandril, is immaterial. It should extend beyond the die into the cylinder an inch or more, and be so fitted as to leave a clear chamber of near two inches in depth between it and the inner surface of the small die, to be hereafter mentioned. The mandril or core *c*, may be of any convenient length, and it is screwed into the holder *g*, above described, extending outwards through the centre of the orifice in the die into the head-plate, and may be readily changed from without. Figs. 5, shew a side view, on an enlarged scale, of one form of holder, with a rod attached; and the mode of its insertion into the large die I, may be seen by looking at these figures in connection with fig. 4. The mandril *c*, having been inserted, the three-inch orifice in the outer side of the large die I, through which the mandril projects, is now contracted to the size of the outer surface of the pipe, to be made by the application of a small die *h*, fig. 1, through the opening in the head-plate. This die is slipped on over the mandril *c*, and just fits into the orifice of the large die. It is thin and cup-shaped on the outside, and is held in its place by a small iron cylinder or tube h^1; one end of which is placed against the small die to which it is fitted, and the other rests against, and is supported by, a strong iron plate, secured to the outside of the head-plate by four strong screws. N, is a plate, which is screwed to the head-plate, and is intended to keep the tube h^1, secure in its place. The centre of the plate N, is hollowed, to allow of the passage of the pipe as it is formed in the dies. By means of the screws which hold the plate N, the position of the small die, in reference to the mandril *c*, may be adjusted, so as to correct any inequality in the thickness in different sizes of pipe.

To effect the tinning process in the above-described machine, a small hole *i*, is first bored from the top of the die-plate H, (see fig. 1,) downward, until it strikes the upper edge of the large die, when it communicates with a small chamber or reservoir *k*, in the top of the die, (see fig. 8,) capable of containing a few pounds of melted tin. From one end of this chamber a hole is bored downward through the die I, until it strikes the end of one of the arms of the fixtures for holding the mandril or core; it is then continued through that arm to the end of the mandril, where it is screwed into the holder: the mandril or core itself is bored or made hollow, so as to continue this channel to a point beyond where the pipe is formed. The channel is there made to communicate, through small lateral apertures, with the outer surface of the mandril. At this point a recess is made on the outside of the mandril, entirely encircling it; that is, the diameter of the mandril is here contracted, but towards its outer end gradually attains its original or nearly its original size. The course of the melted tin, along the channel above described, may be best traced in the partial section, fig. 9, which shews the bearing *g*, for the mandril, in a different position to that of fig. 1.

In manufacturing, as soon as the pipe has started, melted tin is poured into the orifice at the top of the die-plate,and immediately makes its way, through the channel described, to the recess or chamber on the outside of the hollow mandril; which recess is kept constantly full by the pressure of tin above. Every part of the inner surface of the pipe, as it passes along over the mandril, is brought in contact with the melted tin, and thus a perfect coating of tin is given to the interior of the pipe. The parts of the machine which contain the tin must be carefully kept up to the degree of heat necessary to preserve the tin in a state of fusion.

The process of manufacture is as follows:—The lead cylinder M, is first heated (by means of a small furnace constructed for that purpose underneath and around it) to nearly or quite the temperature of melted lead; the cylinder is then filled, through a small hole near the die-plate, with lead, raised to a temperature much above the fusing point. The hole through which the lead is poured is stopped by an iron plug. The machine is immediately put in motion without giving the metal time to set in the cylinder; and the lead is then forced from the cylinder, while fluid, past the holder into the chamber in the large die. The die being inserted, not in the cylinder, but in the large die-plate, which is not exposed to the same degree of heat as the cylinder itself; is of course of a temperature far below that of the cylinder; consequently, as soon as the metal enters this chamber it begins to set; and if, by reason of its being a little too hot, it is not cooled sufficiently by the large die, the moment it touches the small outer die, which is comparatively cold, it becomes solid, and issues from the machine in the form required.

Much care is requisite to keep the different parts of the machine at the proper temperature; for if the heat be too great, the metal will not cool in the large die, but will be forced out in a liquid state. If, on the other hand, too little heat is used, the lead will not pass the holder of the rod in a fluid state, and the pipe made is imperfect and useless, and has to be re-manufactured.

After one charge or cylinder full of lead is forced out, the piston is returned to its starting point by means of a return-pump affixed to the side of the machine, which pump forces the water into the lower end of the press-cylinder below the head of the piston. K, K, in figs. 1, and 2, represent the apparatus for working this pump. Instead of making a conical opening in the die I, as above described, the inventor proposes, in some cases, to turn a series of concentric rings therein, thus forming steps or shoulders to deflect the fluid metal on to the core or mandril.

From the foregoing description it will be seen, that pipes or tubes of various sizes can be readily made by this machinery; for, by unscrewing the plate N, the tube h^1, and the die *h*, may be removed; the mandril *c*, can also, with facility, be unscrewed from its socket, and a smaller or larger mandril substituted; its corresponding die *h*, being then pushed up to its bearing against the die I, by the tube h^1, the plate N, is replaced and bolted to the head-plate A, when the operation may be continued as before.

The patentee claims the mode of injecting tin into metal pipes or tubes during the process of manufacture, in order to cover the inner surface of such pipes or tubes with a coating of tin, as above explained.—[*Inrolled in the Petty Bag Office, March,* 1846.]

Specification drawn by Messrs. Newton and Son.

To HENRY HEATHCOTE RUSSELL, *of Millbank-street, Westminster, civil engineer, for improvements in constructing suspension bridges and viaducts.*—[Sealed 6th December, 1845.]

THIS invention consists in a peculiar mode of applying the main chains from which the platform of suspension bridges is suspended or sustained by rods. According to this method, instead of the chains hanging in curves from the upper part of two towers or piers, as heretofore, each chain descends from the upper part of one tower or pier to the lower part of the next pier; the chains from two adjacent piers crossing each other at a point mid-way between the piers.

In Plate III., fig. 1, is an elevation of a suspension-bridge, constructed according to this invention. The bridge is constructed with only two piers, *a, b,* one on each bank of a river; or it may be considered to represent a viaduct across a space where there is no water. *c, d,* are two of the main chains, any required number of which may be used; the chain *c,* being secured in the foundation, proceeds to the upper part of the tower or pier *a,* and then descending to the lower part of the pier *b,* is made fast in the foundation; the chain *d,* is, in like manner, secured in the foundation, and passes to the upper part of the pier *b,* thence to the lower part of the pier *a,* and is there made fast in the foundation; the chains *c, d,* cross each other at *e,* and may be connected together at that point, if desired. *f, f,* are the rods by which the platform *g,* is suspended from the chains, *c, d.*

Fig. 2, represents another suspension bridge, having a third pier *h,* at the centre. The chains are arranged in a similar manner to those in fig. 1; but, in this instance, they pass through the centre pier *h,* and may be fastened thereto. The patentee recommends that the chains *c, d,* in the upper and lower parts of the piers *a, b, h,* should be connected together by other chains, descending perpendicularly into the foundation of the piers, and there fastened.

Fig. 3, shews a construction of bridge, in which the chains come together at *i,* and descend into the foundation; such chains being supported by two towers or piers *j, j;* and it will be seen that the chains cross each other between the two piers, as in the bridge at fig. 1.

The patentee claims, as his invention, the mode of applying the chains of suspension bridges and viaducts, as above described.—[*Inrolled in the Inrolment Office, June,* 1846.]

To John Finlay, *of Glasgow, in Scotland, ironmonger, for a certain improvement or certain improvements in raising and lowering gas and other lamps, lustres, and chandeliers.* —[Sealed 18th November, 1845.]

This invention consists in the application of atmospheric pressure to the raising and lowering of lamps, lustres, and chandeliers, by causing the atmospheric pressure to suspend or hold in equilibrium the lamps, &c.; this is effected by attaching the lamp to a tube, sliding air-tight upon a piston suspended from the ceiling, beneath which piston, within the tube, a vacuum is created, and the atmospheric pressure is thus brought into action, to support the lamp at any required height.

The figure in Plate II., represents a vertical section of the apparatus employed by the patentee for gas lamps. *a,* is a tube, suspended from the ceiling, having the piston *b,* fastened to its lower end; *c,* is the tube which slides upon the piston; at its upper end it is provided with a cup *d*; and on its lower end is a screw *e,* to which the lamp is attached. *f,* is a tube secured to the bottom of the tube *c,* and is for conveying the gas to the arms of the lamp. *g,* is a shoulder for preventing the tube *c,* from sliding off the tube *a,* when the lamp is drawn down; *h,* is a helical spring, encircling the tube *a,* and resting on the shoulder *g,* so that when the lamp is drawn down to its lowest position, the cover of the cup *d,* coming in contact with the spring, will compress it, and thus the shock, which would otherwise be occasioned by the cover striking against the shoulder *g,* will be prevented. On the top of the piston a quantity of oil is deposited, for the purpose of lubricating the tube *c,* and keeping the leather-cups or packing *i, k, l,* air-tight; the oil is supplied to the packing *k, l,* through the holes or channels *m, m*: the cup *d,* prevents the oil from running over when the lamp is drawn down. Through the body of the piston two small holes *n, n,* are bored, and are covered by a valve, composed of a leather washer *o,* and a brass washer *p,* on which the helical spring *q,* presses. The use of the holes *n, n,* and valve *o, p,* is to create and maintain the vacuum by which the pressure of the atmosphere is brought into operation; for, as the tube *c,* is raised, the air contained between the bottom of the piston and the bottom of the tube is compressed, when, by its elasticity, it will raise the valve and escape through the oil. This movement of the tube *c,* will force the whole or nearly the whole of the air from beneath the piston *b*; and then, on drawing down the tube, the oil and the valve *o, p,* will prevent the air from re-entering the space beneath the piston, and a vacuum will thus be produced.

When it is only required to raise and lower the lamp, lustre, or chandelier, without transmitting gas or other combustible fluid or liquid, the apparatus consists simply of a rod attached to the ceiling, with a piston and valve at its lower end, upon which piston a tube slides air-tight, and from it the lamp, lustre, or chandelier is suspended.

The patentee claims the application of atmospheric pressure to the raising and lowering of gas and other lamps, lustres, and chandeliers, by causing the atmospheric pressure to suspend or hold in equilibrium the lamps, lustres, and chandeliers; the atmospheric pressure being brought into operation by the production of a vacuum in a suitable part or in suitable parts of the lamps, lustres, and chandeliers; whether the vacuum necessary to the use of atmospheric pressure be produced and maintained by the method above described, or by any modification of the said method which shall produce the same results.—[*Inrolled in the Inrolment Office, May,* 1846.]

To HENRY WATSON, *of Newcastle-upon-Tyne, brass founder, for improvements in withdrawing air and vapours from furnaces or other apparatus, and in condensing and employing such vapours.*—[Sealed 6th January, 1846.]

THIS invention consists in apparatus for producing a draft in the flues of furnaces or other apparatus, so as to withdraw air and vapours therefrom; and for condensing some classes of vapours.

The means employed for obtaining a draft will be understood on referring to Plate II., in which fig. 1, is a longitudinal section of part of a flue or passage leading from a furnace or other apparatus. *a*, is the flue; *b*, a hollow cone placed therein; and *c*, a steam-pipe, from an opening in the end of which the steam escapes, and, rushing through the cone *b*, produces the required draft in the flue.

The apparatus represented in vertical section at fig. 2, and in plan view at fig. 3, is used for the purpose of creating a draft, and at the same time condensing the vapours when operating upon lead or other matters in furnaces, &c.; but this arrangement may be varied. It consists of a vessel *a*, divided into compartments by vertical partitions, and connected by the flue or passage *b*, with the furnace or other apparatus; each compartment contains water, or a mixture of water and suitable chemical agents, for acting on the vapours as they pass through the same, in the direction indicated by the arrows; and the requisite draft for withdrawing the vapours from the furnace is caused by a jet of steam rushing through the cone *c*, in the flue *d*. *e*, *e*, are pipes, furnished with cocks, by which the water may be drawn off from one compartment into another. *f*, is a pipe for introducing water into the condenser, as required; and *g*, is a pipe for drawing off the water.

The patentee claims the mode of obtaining drafts for withdrawing air or vapours from furnaces and apparatus, and for condensing such vapours by employing cones and jets of steam, as above described.—[*Inrolled in the Inrolment Office, July*, 1846.]

To Archibald Dunlop, jun., *of Thames-street, in the city of London, Gent., for improvements in the manufacture of aerated water.*—[Sealed 4th December, 1845.]

This invention refers to the manufacture of aerated water containing bicarbonate of lime in solution; a patent for which was granted to W. Maugham, January 31st, 1843*; it consisted in passing carbonic acid gas into a solution of caustic lime in water; but, according to the present invention, carbonate of lime, in a finely divided state, is mixed with water, and caused to dissolve therein by conducting carbonic acid gas into the vessel containing the mixture. The patentee states, that by this method of operating he can not only obtain an aerated solution of bicarbonate of lime of a similar strength to that heretofore made, but, if desired, of even greater strength.

The carbonate of lime used in making the aerated water should be obtained as pure as possible, and in a minute state of division, which may be done by employing white Carrara marble, reduced to a fine powder by mechanical means; or by precipitating carbonate of lime from lime water by means of carbonic acid; or by employing a soluble salt of lime, such as muriate of lime, and precipitating pure carbonate of lime therefrom by means of carbonate of soda. The pure carbonate of lime is mixed with water, in the proportion of sixteen grains or upwards to each pint of water, and is kept mechanically suspended by means of a suitable apparatus. The mixture, while yet turbid, is transferred to another apparatus, such as is used in manufacturing soda-water, and strong enough to resist a pressure of at least 540 lbs. on the square inch; and the carbonate of lime is dissolved by introducing carbonic acid into the vessel: the patentee ascertains when the carbonate of lime is dissolved by withdrawing a small quantity of liquid from the vessel, and if it be perfectly clear and transparent the process is complete. The aerated solution of bicarbonate of lime is then bottled in the ordinary manner.

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* For description of this invention see Vol. XXVII., p. 101, Conjoined Series.

The patentee claims, as his invention, the mixing carbonate of lime, finely divided, with water, and applying carbonic acid thereto, so as to produce an aerated solution of bicarbonate of lime.—[*Inrolled in the Inrolment Office, May,* 1846.]

To DANIEL ROSS, *of South-street, Southwark, in the county of Surrey, hat manufacturer, for improvements in the manufacture of hats.*—[Sealed 27th January, 1846.]

THIS invention relates to such kind of hats as are made with calico or linen bodies; and consists in forming the head-bands and brims of the same of elastic materials.

The mode of carrying out this invention is as follows:—A body of single calico, proofed and stretched in the manner usually adopted for "gossamer" hats, is placed on a block, and cut of such a depth as to allow about an inch for its junction with the head-band. The head-band and brim are made of the fabric termed "elastic web," in which one set of threads is composed of linen or cotton yarn, and the threads which cross these are composed of India-rubber; and, in forming the head-band and brim, the fabric is so applied to the body, that the India-rubber threads lie horizontally, and the linen or cotton threads stand vertically in the head-band, and in a radiating position in the brim: the fabric is prepared in strips of such width as to form the head-band and brim in one piece. The head-band is next secured to the body, by applying to the outside of the lower edge of the body a layer of spirit varnish, an inch deep, and pressing the head-band upon the same with a moderately heated iron; after which, the seam of the head-band is made, by fastening the over-lapping edges together by means of small tacks, and then varnishing and ironing the seam. The block is now placed in the bottom or frame, and the elastic web is stretched and nailed to the frame all round, so as to form the brim of the hat: the seam being made in the same way as the seam of the head-band. The surplus material is cut away close to the frame, and the body, head-band, and brim are coated with the ordinary waterproof composition, and set before the kiln to dry. The other calico coverings are then placed upon the body (but extend only from the "tip" or upper edge of the body to the upper edge of the head-band), and the lower edge of the calico is turned in, to make it of the same thickness as the head-band, or nearly so. The body, head-band, and brim now receive a coat of waterproof composition; and, when dry, the nails are withdrawn, and the brim ironed; care being taken to draw only a few nails at a time, and then to pass the iron over the part from which they have been withdrawn. After this a flat ring of calico is placed on the upper side of the brim (extending from the outer edge to within one-fourth of an inch of the head-band), and a coat of waterproof composition applied thereto; a wider ring of calico is then drawn down over the body, so as to cover the brim and a portion of the head-band, but not extending so high as the lower edge of the calico body. The whole is then finished and ironed in the ordinary manner; and a coat of oil varnish, or other suitable varnish, is applied to the head-band and brim, to restore the elasticity which has been impaired by the application of the waterproof composition: this completes the process, so far as relates to the present improvements.

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The patentee claims, Firstly,—the application of brims and head-bands, formed of elastic web or other similar and suitable material, to bodies of hats formed of linen or calico. Secondly,—the application of oil varnish, or other suitable composition, to the brims and head-bands of such hats, for the purpose of restoring the elasticity which is partially destroyed by the waterproofing.—[*Inrolled in the Inrolment Office, July,* 1846.]

To Thomas Palmer, *of Tavistock, in the county of Devon, carrier, for certain improvements in mine-lifting machinery, which are also applicable to other purposes.*— [Sealed 15th November, 1845.]

These improvements in mine-lifting machinery consist in various methods of producing a continuous rotation of the winding-shaft from the reciprocating movements of a beam or rack.

In Plate II., fig. 1, is a side elevation of part of an improved arrangement of mine-lifting machinery. *a,* is a ratchet-wheel, fixed on the winding-shaft *b*;—*c, d,* are two radial arms, which oscillate on the shaft *b*; and *e, f,* are two rods, connecting the arms *c, d,* with the beam *g,* to which a reciprocating movement is communicated from a steam-engine or other first mover. The outer end of each of the arms *c, d,* carries a spring-catch or pall; and these palls take into the teeth of the wheel *a,* but in opposite directions, as shewn. The action of the machinery is as follows:—On the ascent of the end g^1, of the beam *g,* the rods *e, f,* and arms *c, d,* are raised, and the catch at the end of the arm *c,* carries round the wheel *a,* and winding-shaft *b,* through part of a revolution, corresponding with the extent of the up-stroke; the end of the beam then descending, with the rods *e, f,* and arms *c, d,* the catch at the end of the arm *d,* carries round the wheel *a,* through another portion of a revolution; and by a repetition of these movements a continuous rotation of the winding-shaft is produced.

When a greater degree of speed is required, the double-acting rack apparatus, represented at figs. 2, and 3, is employed. Fig. 2, is a vertical section of the apparatus, and fig. 3, an end elevation, with the frame-work removed. *a*, is a frame, to the inner sides of which two racks *b*, *c*, are bolted; *d*, *e*, are two spur-wheels, mounted loosely on the winding-shaft *f*, and gearing into the racks *b*, *c*; and these wheels carry catches or palls, which take into the teeth of the ratchet-wheel *g*, keyed on the shaft *f*. A vertical reciprocating motion is given to the frame *a*, by the steam-engine or other first mover; in the down-stroke, the rack *b*, causes the wheel *d*, to turn, and its catch carries round the ratchet-wheel *g*, and with it the winding-shaft *f*, while at the same time the rack *c*, turns the wheel *e*, in the opposite direction, and its catch slips over the inclined surfaces of the ratchet-teeth. In the up-stroke, the catch of the wheel *e*, gives motion to the ratchet-wheel, and the catch of the wheel *d*, slips over the ratchet-teeth; and by this means a continuous rotation is imparted to the winding-shaft.

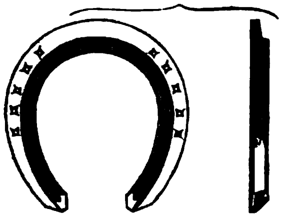
Fig. 4, is a plan view (with the frame *a*, and racks *b*, *c*, in section) of a modification of the machine represented at figs. 2, and 3. In this machine there are two sets of spur-wheels *d*, *e*, and *i*, *j*, and two ratchet-wheels *g*, *h*, with their teeth set in opposite directions; the spur-wheels turn loosely upon a boss *k*, and the ratchet-wheels are keyed thereon; the boss *k*, is firmly connected, by means of a key or feather *l*, to the winding-shaft *f*, along which it is capable of sliding, and the required movement is given by a lever *m*, with a forked end, which embraces one end of the boss. When the two sets of wheels are brought by the lever *m*, into such a position that the interval between them is directly opposite the racks *b*, *c*, the machinery is out of gear; but if the lever be then shifted to either side, the wheels on that side will be thrown into gear with the racks *b*, *c*, which, being in motion, will cause the winding-shaft to revolve. *n*, *n*, are pulleys, fixed upon the outer end of the winding-shaft, and round which the twisting-ropes are coiled in different directions, as is usual in machines of this description.

The patentee claims, as his improvements in mine-lifting machinery, the producing of a continuous rotary motion of the winding-shaft from a series of reciprocating or up-and-down movements, according to the several modes above described.—[*Inrolled in the Inrolment Office, May,* 1846.]

To Charles Powell, *of Smith's-buildings, Leadenhall-street, in the city of London, farrier, for certain improvements in the construction of horse-shoes.*—[Sealed 9th April, 1845.]

The improvements in horse-shoes which constitute this invention are represented in the engraving.

Figs. 2.



Figs. 3.

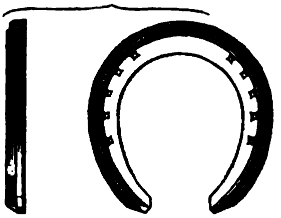


Fig. 1

Fig. 1, shews the transverse section of a bar of iron, steel, or other metal, from which the shoes are to be manufactured; it is produced by means of rolling-mills or similar mechanism, used for fabricating iron bars of different sectional figures. Fig. 2, represents in plan view and section a horse-shoe, formed from a bar of the sectional figure shewn at fig. 1. Figs. 3, shew a plan view and section of a horse-shoe, made by bending the bar in the opposite direction to that in which it was bent to form the other shoe. The heels are made by "jumping" or beating up the ends of each piece cut off from the bar to form a shoe; and these ends are turned down after the bar has been bent into the desired shape. The toes are "steeled," if required, in the ordinary manner. Those portions of the bar which are used for forming the heels are made solid, or without grooves, by leaving plain spaces of sufficient length, at proper intervals, in the rollers of the rolling-mill or other apparatus.

The patentee makes his claim in the following words:— "I claim, as of my invention, the particular modes of arrangement, and the particular combination of parts included in the principles of management upon and in the preparation and transformation of the bar for the purposes of the said invention, in the manner in which I have hereinbefore specified and described the same."—[*Inrolled in the Inrolment Office, October*, 1845.]

To Rees Davies, *of Ystradgunlais, in the county of Brecon, Gent., for improvements in the manufacture of iron.*—[Sealed 24th June, 1844.]

This invention consists in so conducting the process of manufacturing iron, when anthracite, stone-coal, or culm is used, that the charge may be caused to enter the blast-furnace in an ignited state.

Fig. 1, is a vertical section of a blast-furnace, suitably constructed for carrying out this invention; fig. 2, is a horizontal section, taken on the line 1, 2, of fig. 1; fig. 3, is a vertical section of the furnace, taken in the direction of the dotted line 3, 4, (fig. 2,); and fig. 4, is a horizontal

Fig. 1.

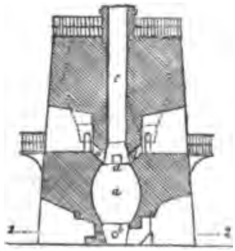


Fig. 3.

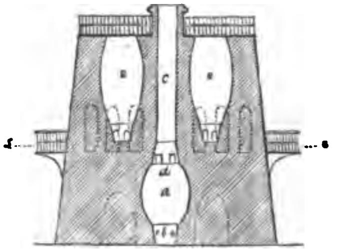


Fig. 2

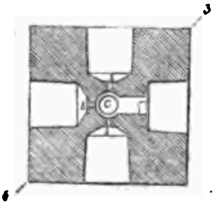
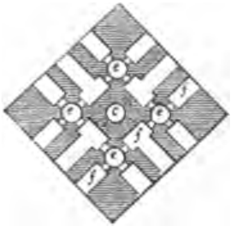


Fig. 4.



section, on the line 5, 6, of figs. 1, and 3. *a*, is the part of the furnace in which the blast operates; this part is constructed in a similar manner to the ordinary blast-furnaces from the lower parts up to the boshes, and the blast (whether hot or cold) is applied in the usual way by the tuyeres *b*, *b*. Above the part *a*, the interior of the furnace is contracted, and forms a chimney *c*, to carry off the gases and products of combustion: the charging of the furnace is not effected through the tunnel-head or chimney *c*, but through the passages *d*, *d*, excepting the first charge, which must be made with unignited materials, in the ordinary way. *e*, *e*, are kilns or chambers, into which the charges of iron ore, fuel, and flux, are continually introduced and ignited; the upper ends of the chamber are open, to receive the successive portions of the charge, and the lower ends communicate with the furnace *a*, by the passages *d*. *f*, *f*, are openings for stirring the charge and regulating the passage of the descending materials from the chambers *e*, into the furnace. The blast does not act on the charge contained in the chambers *e*; but the anthracite being kept in a state of partial combustion, by the draft of atmospheric air through it from the passages *d*, there will be a previous ignition of the charge going on in the chambers *e*: this is important, as anthracite, stone coal, or culm, which has been ignited before being brought into contact with a blast of air, works more favorably in the manufacture of iron (either with hot or cold blast) than when thrown in a cold state into the blast-furnace; and the ore, after the above process, is in a more suitable state for introduction into the blast-furnace.

The patentee remarks, that although he believes it to be best to use anthracite, stone coal, or culm alone, yet other fuel may be mixed therewith; and that although he has shewn the best arrangement of furnace that he is acquainted with, he does not confine himself thereto, so long as the charge can be supplied to a blast furnace in an ignited state.

He claims the manufacture of iron by means of anthracite, stone coal, or culm (whether used alone or mixed with other fuel), which has been, together with the iron-stone or ore and flux, before its projection into the blast-furnace, brought into a state of ignition by a draft of atmospheric air, in chambers so arranged as not to interfere with the blast-furnace.—[*Inrolled in the Inrolment Office, December,* 1844.]

To ALPHONSE LE MIRE DE NORMANDY, *of Dalston, in the county of Middlesex, Gent., for improvements in dissolving lac and shellac, and in rendering fabrics waterproof.*—[Sealed 22nd April, 1845.]

THE first part of this invention refers to two methods of dissolving lac.

According to one method, the shellac, seed lac, stick lac, or any other form of lac required to be operated upon, is first dissolved in an aqueous solution of alkali, by adding to every cwt. of lac, in a suitable vessel, 112 gallons of water, in which about 40 or 42 lbs. of soda-ash have been or are now to be dissolved, and then causing the contents of the vessel to boil, by means of a fire beneath, until the lac is dissolved; —the patentee prefers to use soda-ash, on account of its cheapness; but other alkalies may be employed. After the lac has been dissolved, the solution is filtered through a coarse cloth, to separate any impurities; and then a quantity of sulphuric acid (but nitric, muriatic, oxalic, or other acids may be used), rather larger than is strictly necessary to saturate the alkali employed, being added, the lac becomes separated from the solution in the shape of a semi-viscid or soft plastic mass. This mass may be melted over a fire or otherwise, and afterwards spread upon any surface required to be waterproofed, or used for other purposes, such as cementing together pieces of wood, stone, metal, or fabrics.

The second method consists in pouring upon shellac, seed lac, stick lac, or any other form of lac, a certain quantity of that oil which passes over during the distillation of spirit of wine, obtained from corn or potatoes, and known under the name of grain or potato oil (the fusel oil of Germany, and termed the hydrate of protoxide of ormyle by the chemists), by means of which the lac is entirely dissolved. The quantity of oil used depends upon the degree of liquidity desired.

The second part of this invention consists in rendering fabrics waterproof by the application of a solution prepared by melting the plastic mass, before-mentioned, alone, or dissolving it in the grain or potato oil, or by dissolving the lac, without any previous preparation, in the oil, as described under the second method; but the patentee prefers to use the plastic mass on account of its greater pliancy or suppleness. The plastic mass is also perfectly soluble in alcohol and naphtha.

The patentee does not claim the dissolving of lac in alkali, and applying it in that state; but he claims, as his invention, treating the alkaline solution of lac with sulphuric acid, or other acids, so as to obtain the lac in a solid, semi-solid, or viscid form, from the said solution; also the use of the potato or grain oil, called hydrate of protoxide of ormyle, for the purpose of dissolving lac or shellac, or the lac obtained by the action of sulphuric acid upon the alkaline solution, as above described; and likewise covering fabrics with the lac obtained by the processes above described, for the purpose of rendering them waterproof.—[*Inrolled in the Inrolment Office, October,* 1845.]

To John Henry Shearman, *of Shaftesbury-crescent, Pimlico, in the county of Middlesex, Gent., for a method of separating and extracting the grease and oil and oleaginous matter from water, in which any such matter may be contained; more particularly the water used in the cleansing of wool, spun wool, and woollen cloth.*—[Sealed 7th April, 1845.]

This invention consists in a mode of extracting the grease, oil, or oleaginous or saponaceous matter from water containing the same, particularly the water which has been employed for cleansing wool, spun wool, and woollen cloth.

The water to be operated on is introduced into a large cistern, and the patentee then proceeds to neutralize the alkali contained in the oleaginous or saponaceous matter of the water, by the use of one or more of the acids capable of effecting this object (such as sulphuric acid), according as the bases of the soap and the calcareous matter contained in the water varies: it will sometimes be necessary to employ several acids, one after the other. By the action of the acids upon the alkali, a scum, having the appearance of mud, rises on the surface of the water, and is carefully removed therefrom with a large skimmer, and put into a leaden cauldron, or other vessel not injuriously acted upon by the acid; which vessel is to be heated by steam or otherwise. The scum is heated to 80° Reaumur, or 212° Fahr., and treated with muriatic acid, more or less diluted; the liquid still contained in the scum is allowed to subside to the bottom of the cauldron, from whence it is drawn off by a tap or pump; the residue is boiled for several hours, and the oil which then appears on the surface is taken off, from time to time, by means of a large copper shovel; when the oil ceases to appear, the residue is submitted to the action of a powerful press, to extract the remaining oil. The oil or grease, thus obtained, is in an acid state (being either stearic, margaric, or oleic acid, or a mixture of them), and is to be put into a copper cauldron, and heated to 60° or 70° Reaumur; powdered chalk is then mixed with the oil or grease, in order to neutralize all acidity as far as possible; which neutralization is to be finished by the addition of zinc, either in the state of shavings, filings, or fine powder. This mixture is to be stirred for thirty minutes, and the heat gradually increased during this time to the boiling point of water; it is then allowed to rest for a few minutes, and boiling water, to the amount of one-tenth of the volume of the oil, is poured upon the mass, which is now stirred for twenty minutes, and left to rest for about two days: a small degree of heat being maintained to facilitate the precipitation of the water and other matters. At the expiration of the two days, the oil or grease is drawn off, and is ready for use.

The patentee claims, as his invention, the operating on water containing grease, oil, oleaginous or saponaceous matter, for the purpose of extracting such grease, oil, oleaginous or saponaceous matter, therefrom, as above described.—[*Inrolled in the Inrolment Office, October,* 1845.]

To Henry Tylor, *of the firm of Tylor & Pace, of Hackney, in the county of Middlesex, for improvements in fabrics used for and applicable for curtains, screens, blinds, and other like useful purposes.*—[Sealed 28th March, 1845.]

This invention relates to the manufacture of fabrics for curtains, screens, blinds, &c., and is divided into four parts.

The first part of the invention consists in manufacturing fabrics, for the above purposes, by permanently uniting two sheets of some transparent material or materials, one perforated with any desired pattern, and the other unperforated; so that when the compound fabric is held up to the light, the half perforated parts will be more transparent than the other portions of the fabric, and the pattern will be distinctly visible. The sheet that is to be perforated is preferred to be made of paper or pasteboard, and the perforations are formed therein by the machinery commonly used for perforating sheets of paper or metal; after which it is laid on a table, and its upper surface coated with paste; it is then lifted from the table, and placed with the pasted side downwards upon a sheet of linen, cloth, or other woven fabric, that has been stretched in a frame while wet or damp, and the two surfaces are carefully pressed together with a damp sponge, which removes, at the same time, any superfluous moisture or paste; when dry, the united sheets are removed from the frame, and passed between rollers, to combine them more closely and give them a glazed appearance. If the sheet to be perforated is composed of some woven fabric, such as silk or cotton, it is first stretched in a frame, and coated with gum, size, or other adhesive substance, to stiffen it, and cause the fibres to adhere closely together; when dry, it is removed from the frame, and placed upon, or slightly attached by the ends to, a sheet of paper, with which it is passed through the apparatus for punching the pattern: by thus sizing the fabric, and placing a loose sheet of paper beneath it, the perforations will be formed with smooth edges. The perforated sheet, and the unperforated one may be either of the same or different colors. Fabrics thus formed are most suitable for in-door use, to produce a diminished and softened light, such as transparent curtains, roller or framed window blinds, coach blinds, &c.

The second part of the invention consists in making fabrics by uniting two sheets of different colors, one perforated and the other unperforated, and one or both of them opaque. These fabrics are formed in the same manner and of the same materials as those above described, except that the opaque sheets are either of a thicker or darker sort. They are used for making fire-screens, book-case doors, and other articles, intended to intercept heat or dust.

The third improvement consists in rendering the above fabrics impervious to wet, by interposing between the two sheets a layer of caoutchouc, either in solution or in a state of soft pulp. The fabrics prepared in this manner are suited for out-door use, and may be employed in the manufacture of outside window blinds, umbrellas, parasols, and other similar articles.

The last part of the invention consists in preparing a material for making dwarf window blinds. The patentee takes two or more sheets of paper, and after coating the surface of one or both with paste, he interposes a sheet of cotton, linen, or other woven fabric, which has been previously coated with size or other stiffening solution, and combines them by pressure in the same manner as pasteboard is generally manufactured. When dry, the fabric is perforated with various devices, similar to those of the ordinary perforated dwarf metallic blinds; the surface is then painted and varnished, and afterwards glazed, by means of rollers, so as to produce a close imitation of metallic blinds.

The patentee claims, Firstly,—the sole right to manufacture fabrics, applicable for curtains, screens, blinds, and other like useful purposes, of two sheets or pieces of some transparent material or materials, permanently united together; one of which is perforated with holes according to a given pattern or design, and the other is left entire or unperforated. Secondly,—the sole right to manufacture fabrics, applicable to the said purposes, of two sheets or pieces, permanently united together; one of which is perforated according to any given pattern or design, and the other is left entire or unperforated, and is of a different color; and one or both of them is or are opaque, instead of being transparent. Thirdly,—the sole right to manufacturing, for the same purposes, the double fabrics of either of the descriptions aforesaid, rendered impervious to wet by the application of caoutchouc. Fourthly,—the sole right of manufacturing fabrics, for the purpose of dwarf window blinds, composed of two or more sheets of paper, with a sheet of linen or cloth interposed between and permanently united to them, and then perforated in patterns, through and through, as above described.—[*Inrolled in the Inrolment Office, September*, 1845.]

Scientific Notices.

ON THE STORING AND PRESERVING OF GRAIN.*

BY JOHN GEORGE BODMER, ESQ.

THE idea of preserving grain, and particularly wheat, in large quantities in granaries, for the purpose of supplying the wants of the population in times of scarcity, is of ancient date; but the deterioration of the grain, and the enormous expense attending its preservation, have hitherto prevented the permanent establishment of national store-houses for this purpose.

In all human concerns we find that a certain degree of regularity is not merely beneficial, but even necessary; from which it follows, that an approximation to regularity, or as small a fluctuation as possible, in the trade of grain, would be of immense benefit to commerce generally, and to the working classes particularly. It would be useless to attempt to enumerate the arguments that might be brought forward in favor of this proposition; we may, therefore, at once proceed to consider the means by which a certain regularity in the prices of grain could be maintained, or, rather, too great a variation prevented.

In 1817, the author, then in the German service, proposed the erection of granaries, composed of large and very slowly revolving barrels, which were to be filled, to a certain extent, with grain, and kept in motion daily for a certain time; by which means the author considered the fermentation and heating of the grain could be prevented, and insects kept from it; and therefore the grain might be preserved for any length of time. The proposal looked too singular, perhaps too expensive, and the plan was given up.

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* This Paper, which was read before the Society of Arts, at a late meeting, has, by the kindness of the author, been placed in our hands, with liberty to make such extracts as may be thought sufficient to give a general notion of his plans for storing and preserving grain.

M. Vallery, a French engineer, has since treated the same subject: he has not simply proposed the same arrangement, but he has improved upon, and executed it on a large scale. Experiments have been made, and the reports made upon the subject shew that the arrangement answered the purpose extremely well. M. Vallery has taken out a patent for the invention, which he describes not only as being useful for keeping the corn in motion, but also for imparting moisture to the grain, if necessary.

In 1830, the author made plans and drawings for a flour mill; remembering his proposal of the revolving granary in 1817, he thought, that by merely altering the partitions within the barrel, the same arrangement might be advantageously used for moistening the grain before putting it upon the mill-stones. The author is far from accusing M. Vallery of having made free with his invention; he, however, begs to state that the drawings laid before the Society were made in 1830; that the constructive details of of the revolving granary of M. Vallery is very much the same as his own; that the application of a fan, to act upon the interior of the barrel, is clearly shewn; and that these plans were seen in France between the years 1830 and 1832; while M. Vallery's patent was not taken out until 1836.

M. Thomas, who examined and reported upon Vallery's granary, has made, it appears, some correct calculations upon the expenses of preserving grain, upon the consequent waste, &c., and also upon the good, middling, and bad harvests; all of which seem to be based upon official papers and upon experience. M. Thomas shews, in Tables, what risk and benefit is likely to attend the erection of public granaries. It appears that the average of harvests is, two very good, four middling, and one bad, in seven years; and that upon such data a pretty correct calculation might be made without much risk.

* * * * * *

When we contemplate the alarm caused by Sir Robert Peel's measure, what is to be expected from an attempt to make England the granary of the globe? What will those say who are so much afraid of any free importation?

Before proceeding to speak of so bold a step, let it be understood, that the intention is to put in motion the heaviest article of commerce, when calculated according to its consumption per individual; but, at the same time, the most precious and most essential article of commerce, perhaps the only one which is absolutely indispensable to human existence in a civilized country.

The motion produced by a general and regular trade in grain will bring incalculable benefit to England, and to any other country that possibly could participate in it. The effect of motion is wonderful, though it is not understood, and is difficult to be explained. A simple fact, nevertheless, must be admitted, that the shilling which changes owners twenty times in one day, does the work of one pound that only changes owners once a day. It is motion, combined with speed, and the utmost regularity, that produces effects for which we cannot yet account. Let us endeavour to put grain in motion, and food and work for those that want it must be the inevitable consequence.

Before entering into the details of the plan, let us remember, that as yet a large portion of the inhabitants of the globe consume but little grain. We must calculate upon a much larger consumption, as soon as the means are found to bring it within their reach.

M. Thomas has proposed the formation of Companies for the purpose of working M. Vallery's revolving granaries, if not over all France, at least at Paris. The very clever and clear mode of explaining the probable consequences of such an arrangement in France is deserving of more than ordinary attention. Much useful information is given as to the mode of working the system, and how the government could, after a certain number of years, become proprietors of the granaries, &c.

With regard to England, the question might perhaps be hazarded, whether the railway companies could not be induced by the government to take upon themselves the erection of storehouses or granaries, at such stations on their lines as would be considered the most appropriate for the supply to, and collection of grain from, certain districts of the country. The granaries for the export trade, of course, would have to be erected by extra companies, at such seaports as would be considered the most convenient for the purpose of trading with certain parts of the continent.

In order to illustrate his plans, the author has appended drawings of his revolving granary, which is suitable only for small stores; also an apparatus to be used in large granaries for turning over the grain; and likewise an arrangement of buildings and apparatus for storing and preserving grain for any given period. The following description refers to the figures in Plate III.

Description of Plan,—No. 1.

Fig. 1, represents a side elevation, and fig. 2, a transverse section of the revolving granary; which in this case is arranged to be used in a flour-mill, for the purpose of moistening the corn.

The barrel 1, is made of wood, hooped with wrought-iron, and the lower ends are fixed into the lugs in the usual way. To these ends the iron rings 2, are bolted; the projecting rims 3, of which serve as centres, and run in grooves in the antifriction rollers 4, and 5; which rollers revolve on the studs 6, fixed in the framing. The four wrought-iron stays 7, connect the two ends of the barrel, and at the same time secure the rings 2, to the wood-work. It is evident that this barrel will revolve easily upon the antifriction rollers 4, and 5, although the rims 3, are of a large diameter. The partitions 8, are placed in the barrel, in such a manner as to allow the corn to drop from one to another, or to roll over, as the drum revolves slowly in the direction of the arrow. Upon the centre shaft 9, a brush is mounted, which revolves in a case 10, and dipping into water, supplied by the pipe 11, sprinkles it upon the corn. The toothed wheel 12, is bolted to one of the ends of the barrel, and is driven by a pinion on the axle 13, to which the pulley 14, is fixed. 15, is a pulley upon the shaft 9, and is driven by means of a strap from the pulley 14.

Fig. 3, represents a longitudinal section of a granary in which the corn can be stored to a depth of about 30 feet.

The corn is stored between walls 1, which are to be about 25 feet apart; and on the top of these walls, pillars 2, are placed, to support a trough 3, over which a corrugated roof 4, is fixed.—5, are rails, fixed to the bottom plates of the pillars 2; and upon them the carriage-wheels 6, travel. The two sides 7, of the carriage, in which the axles of the wheels revolve, are connected by the beams 8, and 9; and to these beams the rods 10, and 11, are fixed, which support the bearings 12, in which the shaft of the drum 13, revolves: these bearings are stayed by the cross-rods 14, and 15. Upon the wrought-iron tube 16, three chain-wheels 17, are fixed, the teeth of which take into the links of the chain 18; and upon the end of the shaft 19, which forms the centre of the tube 16, the spur-wheel 20, is fixed. A pinion 21, is fixed to the spur-wheel 22, and drives the wheel 20; and a pinion on the shaft of the grooved pulley 24, drives the wheel 22. The shaft of the pulley 24, revolves in bearings cast on the sides of the carriage. Another groove-pulley 26, also revolves in bearings, cast on the sides of the carriage, and allows the rope 28, to take into the four grooves of the pulley 24. The pulleys 29, and 30, are keyed upon shafts connected with the engine; and drive, by means of the rope 28, and the pulleys 24, and 26, the chains 18, with the scoops attached to them. A pinion on the shaft 19, drives the wheel 32, on the shaft of which is a pinion, taking into the teeth of a rack cast on the rails 5. It is therefore evident, that as soon as the rope 28, is set in motion, the scoops begin to take the corn up from the heap A, and throw it into the spout or sieve 33, which receives a slight rocking motion, in order to throw the corn upon the heap B. In proportion as the corn is taken up from the heap A, the carriage advances, diminishing, as it goes on, the length of the heap A, and increasing the length of the heap B, thereby causing every individual grain to turn and roll over a considerable space. The side walls are constructed near the floor of the store-room, to a height of about twelve or fifteen inches, so as to guide the corn into the scoops near the floor, and allow sufficient space for them higher up. The partition 34, which is connected by iron stays to the carriage and the bearings 12, is for the purpose of narrowing the space between the heaps A, and B, and aiding, by the pressure of the heap of grain B, the progress of the carriage.

It is evident that the granary may be constructed of any convenient length, say from 300 to 400 feet; and the speed of the carriage should be so proportioned as to turn seventy-five quarters over in every minute. As the granary is intended to be built with three, five, seven, or nine partitions, for all of which only one carriage need be used, the author proposes to place a turn-plate upon a travelling frame at each end of the granary, on which the carriage, with the scoops, may be received, after it has gone through one partition. To the upper face of the turn-plate pillars are bolted, for the purpose of supporting, at their upper ends, beams which exactly correspond with the rails 5; and upon these beams the carriage is run out. The turn-plate is then moved round one half of a revolution, and pushed forward to the next partition, into which the carriage, with the scoops, is made to enter, for the purpose of performing the same operation as before. The author remarks, that it is unnecessary to enter into the details of the machinery, because what is laid before the Society is merely to give a general idea of the arrangement. It is, however, necessary to state, that the driving-pulleys 29, and 30, are so arranged, that the moment the machine has performed its duty, the rope 28, can be stopped,—the pulleys 24, and 26, can be detached from the carriage,—and those belonging to the next partition put in their places the moment the carriage has taken its place. The frame 35, is placed at the end of each heap of grain, for the purpose of enabling the scoops to take up the last portion of the heap; and this frame is moved upon the turn-plate, and carried to the same partition with the carriage and scoops. The dotted lines 36, represent hot-air flues under the floor of the granary, from which the air enters into the grain through perforated iron plates, placed in the floor.

Fig. 4, represents a transverse section of a third method of constructing granaries; and fig. 5, is a partial ground plan of the same.

The granary, shewn in these plans, consists of thirty-six compartments, sixty feet square, and between sixty and seventy feet deep, capable of containing about 22,000 quarters each, or nearly 800,000 quarters when full. The walls of these compartments or pits are held together by iron tiers, at certain distances, as clearly shewn in the compartments A, and B, fig. 4, and the compartment C, in fig. 5. The bottom of these pits is funnel-shaped, and rests upon arches 1, which follow the walls of each compartment, and are connected with the main arches 2, by the openings 3, which are in connection with the apparatus for heating and supplying the air.

The arches 4, connect all the compartments with the hoist for raising and lowering the grain. When corn is brought to the granary, it is hoisted to the top of the building, and placed in a box 5, capable of containing from 60 to 80 quarters. This box is placed on the carriage 6, which travels on rails at the top of the walls 7; and when the carriage arrives opposite to that compartment which is to be filled with grain, a click is disengaged, and the box 5, inclined to one side, for the purpose of discharging the grain into the compartment, through the spout 8.

We will now suppose that the compartment D, is full of corn up to the line 9; and the carriage 10, with the chain of scoops 11, placed opposite to the middle of the compartment, and the machinery set in motion;—the corn is then allowed to run through the tube 12, and the channel 13, into a box 14, placed upon the carriage 15, on which the drum that carries the chain and scoops revolves. It is evident that, as the corn from the compartment D, is discharged into the box 14, it is taken up by the scoops 11, which empty themselves into the trough 16, and through that it passes again into the compartment D; and in this manner the whole amount of grain contained in that compartment is kept in motion; while a great quantity of hot and perfectly dry air is forced through the flue 1, and the perforated iron plates by which the passage *b*, is covered. This operation may be continued for an hour or two, and then the apparatus is moved to the next compartment, for the same purpose.

When the corn is to be taken out of the compartment, a carriage 17, with a box 18, similar to the box 5, is brought on rails in the archway 4, under the pipe 19. The channel 13, is then removed, and, by means of a throttle-valve in the pipe 19, the grain is let into the box 18, and then brought to the hoist.

The main flue E, of the granary (see fig. 5,) is connected with the air-stoves I, by means of the flues K; and the air may be driven through the flues E, into the compartments, either by means of a fan, or by pumps worked by the engine.

The drawings and descriptions of the proposed granaries, and the calculations, shew that a quarter of corn or grain can be taken from a waggon or cart, or from on board a vessel, into the granary, put upon a heap 30 feet deep, turned over from top to bottom 150 times a year, ventilated by a draft of air the whole time, measured or weighed, and loaded again upon waggons, for less than 6*d*. a quarter per year, including the interest, at 7 per cent., of the capital invested in building and machinery; and that one granary, which contains from 170 to 200,000 quarters, can be erected at a cost not exceeding £40,000 to £60,000.

Every grain is rolled, once in 50 hours, over a space of about 60 feet, and is exposed to a draft of air in its passage; it is cleared from dust, and separated from any extraneous matters that may happen to be amongst the grain; and the grain is exposed during the whole time to a current of perfectly dry air.

It is not probable that any insects could preserve hold in or upon any grain exposed to such a motion; and as the corn will be made perfectly dry and hard in less than a fortnight, and a strong current of air constantly passes over the whole surface of the heap of corn, in addition to the creeping dry air within, it is not to be supposed that any insect will attack the corn or grain from without; and heating or fermentation is, of course, perfectly impossible.

To propose the storing of 200,000 quarters of grain in one storehouse or granary, and to talk of preserving 10 and even 30,000,000 quarters, for four, five, six, and seven years, or more, looks little better than madness; nevertheless, when we enter into the details, and reduce the questions to figures, we shall find that the plan loses very much of its spectre-like appearance; though it cannot be disputed that the undertaking would be, in its vastness, as well as in its consequences, equal, if not superior, to that of steam navigation and railroads.

It is on account of the magnitude of the plan that we must endeavour to reduce the waste, as well the expenses of the management, to the lowest possible fraction; but when we find the interest of the capital in trade at 5 per cent., and that of storehouses, machinery, &c., at 7 per cent., and all other expenses included, do not add more than 2*s.* 6*d.* to the price of a quarter per year, in taking an average of seven years, we can no more doubt the practicability and success of the plan. We must understand that grain, say wheat, that has been housed at 35*s.* a quarter, can be sold, *not a quarter*, but a quantity, containing exactly the same amount of nourishment, in perfectly as good, or rather a better condition, after seven years storing, at 52*s.*, and amply remunerate the company. Whether the plan suggested by M. Thomas, for putting the government into possession of the granaries, after a certain number of years, would be applicable to this country, is doubtful. Nevertheless, if it were found desirable that the government should control the actions of the companies, and prevent them from causing a rise in grain, a limit may be set, by Act of Parliament, to the profits of the companies.

In contemplating the project simply as an ordinary business or operation of trade, we must conclude that it will benefit the landed interest to a great extent. Suppose, that by an abundant harvest, prices at home and abroad are depressed, the companies would unquestionably fill their granaries with cheap grain; and, whether bought at home or abroad, the home market would for a time be rid of that amount of grain of which the companies have taken possession, and which would otherwise have still further depressed the market. It is also quite evident that the regularity of the home market must increase in proportion to the extent of the granaries.

ON THE COMPOSITION OF THE FIRE-DAMP OF THE NEWCASTLE COAL MINES,—BY THOMAS GRAHAM, ESQ., F.R.S.

[*From the Philosophical Journal.*]

SOME years ago I examined the gas of these mines, with the same result as Dr. Henry, Davy, and Dr. Turner, had previously obtained, namely, that it contains no other combustible ingredient than light carburetted hydrogen. But the analysis of the gas of the coal mines in Germany, subsequently published, shewing the presence of other gases, particularly of olefiant gas, has rendered a new examination of the gas of the English mines desirable. The gases were,—1, from a seam named the Five-Quarter seam, in the Gateshead colliery, where the gas is collected as it issues, and used for lighting the mine; 2, the gas of Hebburn colliery, which issues from a bore let down into the Bensham seam,—a seam of coal which is highly charged with gas, and has been the cause of many accidents; and 3, gas from Killingworth colliery, in the neighbourhood of Jarrow, where the last great explosion occurred. This last gas issues from a fissure in a stratum of sandstone, and has been kept uninterruptedly burning, as the means of lighting the horse-road in the mine, for upwards of ten years, without any sensible diminution in its quantity. The gases were collected personally by my friend Mr. J. Hutchinson, with every requisite precaution to ensure their purity, and prevent admixture of atmospheric air.

The usual eudiometrical process of firing the gases with oxygen was sufficient to prove that they all consisted of light carburetted hydrogen, with the exception of a few per cent. The results were as follows:—

Gateshead Gas.—Specific gravity 0·5802.

Carburetted hydrogen	94·2
Nitrogen	4·5
Oxygen	1·3
	100·0

The density of such a mixture is, by calculation, 0·5813.

Killingworth Gas.—Specific gravity 0·6306.

Carburetted hydrogen	82·5
Nitrogen	16·5
Oxygen	1·0
	100·0

The theoretical density of this gas, deduced from its composition, is 0·6308.

The Hebburn gas was of specific gravity 0·6327.

Seventy-nine measures of the Killingworth gas, mixed with an equal volume of chlorine, left in the dark for eighteen hours, and afterwards washed with alkali, were reduced to 75 measures; from which the presence of 4 measures of olefiant gas might be inferred. But in a comparative experiment made at the same time on 25·3 measures of pure gas of the acetates, mixed with an equal volume of chlorine, a contraction occurred of 1·3 measure; that is, in exactly the same proportion as with the fire-damp.

It was observed that phosphorus remains strongly luminous in these gases, mixed with a little air, while the addition to them of one-four-hundredth part of olefiant gas, or even a smaller proportion of the volatile hydrocarbon vapours, destroyed this property. Olefiant gas itself, and all the allied hydrocarbons, were thus excluded.

Another property of pure light carburetted hydrogen, observed by myself, enabled me to exclude other combustible gases; namely, that the former gas is capable of entirely resisting the oxidating action of platinum black, and yet permits other gases to be oxidated which are mixed with it even in the smallest proportion, such as carbonic oxide and hydrogen,—the first slowly, and the last very rapidly; air or oxygen gas being, of course, also present in the mixture. Now, platinum black had not the smallest action on a mixture of the gas from the mines with air. No moisture appeared, or sensible contraction, and no trace of carbonic acid could be discovered after a protracted contact of twenty-four hours; while, with the addition of one per cent. of hydrogen, the first effects were conspicuously evident in three minutes, and with the same proportion of carbonic oxide, the gas became capable of affecting lime-water in half an hour. These experiments were repeated upon each of the three specimens of fire-damp.

Potassium fused in the fire-damp did not become covered with the green fusible compound of carbonic oxide, nor occasion any contraction. Indeed, however carefully the heat was applied to the potassium, by means of an oil-bath, a slight permanent expansion always ensued. The same thing occurred in pure gas of the acetates. It appeared that potassium could not be heated above 300° Fahr. in pure carburetted hydrogen, without causing a decomposition and the evolution of free hydrogen gas.

The gas was also inodorous, and clearly contained no appreciable quantity of any other combustible gas than light carburetted hydrogen. The only additional matters present were nitrogen and oxygen; the specimen collected in the most favorable circumstances for the exclusion of atmospheric air, namely, that from the Bensham seam, still containing 0·6 per cent. of oxygen. The gases also contained no carbonic acid.

It is worthy of observation, that nothing oxidable at the temperature of the air is found in a volatile state associated with the perfect coal of the Newcastle beds. The remarkable absence of oxidability in light carburetted hydrogen appears to have preserved that alone of all the combustible gases originally evolved in the formation of coal, and which are still found accompanying the imperfect lignite coal of Germany, of which the gas has been examined. This fact is of geological interest, as it proves that an almost indefinitely protracted oxidating action of the air must be taken into account in the formation of coal; air finding a gradual access through the thickest beds of superimposed strata, whether these strata be in a dry state or humid.

In regard to measures for preventing the explosion of the gas in coal mines, and of mitigating the effects of such accidents, I confine myself to two suggestions. The first has reference to the length of time which the fire-damp, from its lightness, continues near the roof, without mixing uniformly with the air circulating through the workings. It was found that a glass jar, of six inches in length and one inch in diameter, filled with fire-damp, and left open with its mouth downwards, continued to retain an explosive mixture for twenty minutes. Now it is very desirable that the fire-damp should be mingled as soon as possible with the whole circulating stream of air, as beyond a certain degree of dilution it ceases to be explosive. Mr. Buddle has stated, "that immediately to the leeward of a blower, though for a considerable way the current may be highly explosive, it often happens that after it has travelled a greater distance in the air-course, it becomes perfectly blended and mixed with the air, so that we can go into it with candles; hence, before we had the use of the Davy lamp, we intentionally made 'long runs,' for the purpose of mixing the air." It is recommended that means be taken to promote an early intermixture of the fire-damp and air; the smallest force is sufficient for this purpose; as a downward velocity of a few inches in the second will bring the light gas from the roof to the floor. The circulating stream might be agitated most easily by a light portable wheel, with vanes, turned by a boy, and so placed as to impel the air in the direction of the ventilation, and not to impede the draft. The gas at the roof undoubtedly often acts as an explosive train, conveying the combustion to a great distance through the mine, while its continuity would be broken by such mixing, and an explosion, when it occurred, be confined within narrower limits.

Secondly, no effective means exist for succouring the miners after the occurrence of an explosion, although a large proportion of the deaths is not occasioned by fire, or injuries from the force of the explosion, but from suffocation by the after damp, or carbonic acid gas, which diffuses itself afterwards through all parts of the mine. It is suggested that a cast-iron pipe, from eight to twelve inches in diameter, be permanently fixed in every shaft, with blowing apparatus, above, by which air could be thrown down, and the shaft itself immediately ventilated after the occurrence of an explosion. It is also desirable that, by means of fixed or flexible tubes, this auxiliary circulation should be further extended, and carried as far as practicable into the workings.

ON THE CAUSES TO WHICH MUSICAL SOUNDS PRODUCED IN METALS BY DISCONTINUOUS ELECTRIC CURRENTS ARE ATTRIBUTABLE.—BY PROF. ELIE WARTMANN.

SINCE the discovery made in 1837 by Dr. Page, and verified the following year by Prof. Delezenne, of the possibility of producing a musical sound by electricity, this interesting phenomenon had scarcely been studied, when in 1844, MM. Marian, Beatson, Gassiot, and De la Rive all at once made known the various conditions of its production. The interesting memoir of the last gentleman, printed in Vol. 5, p. 500 of the *Archives de l'Electricité*, contains a great number of very valuable results. But the theoretical part of the subject has not yet been presented under a precise and general form, and it is with a view to supply, if possible, this gap, that I have undertaken the following experiments. I imagined them in the month of August 1845, in consequence of a meeting at which M. De la Rive exhibited his curious apparatus to Prof. Dove and myself.

A well-annealed soft-iron wire, $1^{m}\cdot7$ long and $2^{mm}\cdot5$ in diameter, was fixed in a horizontal position on a thick trencher of hard wood inserted into the wall. One of its extremities was held back by the jaws of a clamp, whilst the other supported a weight of 24 kilogrammes. Upon a cork, pierced by friction with the wire, I arranged a small plane mirror, with parallel faces, made at the Optical Institute of Munich and intended to reflect, into a telescope furnished with cross wires, the divisions of a scale placed at a distance of two metres. This arrangement, similar to that of the magnetometer, exhibits the least deviations of the reflecting surface, when it is not displaced parallel to itself. The iron wire passed through a wooden reel, the bore of which was five centimetres in diameter, and on which were rolled three copper wires enveloped with silk, $23^{m}\cdot$ 6 long and 3 millimetres in diameter. I employed a Buusen's battery of eleven pairs, and a mercurial rheotome or contact breaker; these two instruments were enclosed in an ante-room adjoining the laboratory.

According to the place which the wire occupies, it becomes the seat of greater or less transversal vibrations, whose plane may be varied at will. In general, in any position of the wire, the intensity of the effect varies at different points of its length, as is perceived on bringing the mirror to such points. The amplitude of the vibrations is not the same for different parts of the wire subjected similarly to the reel. M. De la Rive found this by the comparison of the sounds obtained. These phenomena result from the attraction exerted upon the wire by the parts of the coil which are the nearest to it: they cause a distinct class of sounds. But there exists another cause of vibrations in the wire, the effect of which is more or less independent of this lateral attraction. Longitudinal vibrations are produced in it, with which correspond sounds of a peculiar character. If the axis of the reel was identical with that of the wire, supposing it exactly rectilinear and cylindrical, a transverse deviation would no longer take place. But even then, the molecules on which the electro-magnetic action is exerted are attracted right and left of the centre of the axis of the reel towards this central point, as a steel needle is seen to be drawn into it as soon as it is introduced into the hollow of the helix. It is this internal vibration which, by the discontinuity of the electric current, is rendered periodical in two opposite directions, that determines the second class of sound.

Let us now pass to the case of the current transmitted by the wire. In order to study it, I substituted for the mirror the spherical and perfectly polished bulb of a small mercurial thermometer. The optical axis of the telescope, passing through the intersection of the crossed wires, was directed on the brilliant image of a luminous point reflected very obliquely at the upper part of the convexity. This arrangement discovers any change in form of the wire, even in the direction of its length. I was not able to perceive any elongation of the wire under the electric action, although it gave a very distinct sound. I attribute the principal cause of this sound to the polary arrangement which the molecules undergo in order to give passage to the electricity. This arrangement is manifest in many cases, and I have elsewhere pointed out a very great number of them. It is the result of a struggle between the molecular forces which constituted the primitive state of equilibrium of the body and the new activity which the dynamical condition of the fluid excites. If the flow of the latter is continuous, this struggle is instantaneous, and the noise which it occasions is null or nearly so; but it recommences with each closing of the circuit if the flow is periodical.

It is already known from the experiments of M. Peltier, and of various scientific men, that the prolonged passage of the electricity by metallic wires alters essentially their tenacity. It seemed to me very probable that the elasticity of wires subjected for some time to the intermittence of currents which renders them sonorous, must be altered in a permanent manner.

Since the experiments just mentioned were made, M. Wertheim has published a very interesting note, in which he describes a process of observation analogous to mine, although less delicate, and indicates the causes to which he attributes the sounds produced. Although I agree with him on most points, I differ from him both as to what relates to the attraction exerted from the two sides of the centre of the helix, an attraction which he does not mention, and in the explanation of the case in which the wire is directly traversed by the discontinuous current. The skilful experimentalist whom I have just named attributes the sound produced to the heat engendered by the current. Nevertheless my wire indicated no perceptible heat. It results from the experiments of M. De la Rive and my own, that the sonorous state continues with more than 600 interruptions a second. How shall we admit that the elevation of temperature and the diminution of elasticity which accompany it can disappear in $\frac{1}{600}$th of a second? The current of a pile of eleven pairs certainly does not alter the thermical state of a bar of a centimetre square in section, as I have directly established: nevertherless, if it is discontinuous, it renders it sonorous. I may add, finally, that this heating does not take place when the reel is employed, as any one may convince himself by placing a bismuth and iron pair in its hollow, connected with a very delicate rheometer. Nevertheless, the sonorous property may be the same as with the wire directly subjected to the current.—*Ibid.*

Translated from the "Bulletin de la Société d'Encouragement," for the London Journal of Arts.

ON SOME PRODUCTS OF CHINESE MANUFACTURE, COLLECTED BY M. JULES ITIER, CHIEF INSPECTOR OF CUSTOMS.

I. *On two kinds of textile plants, from which fine Canton lawn or cambric, called in England grass-cloth, and coarse fabrics are produced.*

Several varieties of fabrics are to be met with in the Chinese market, differing very much from any European manufacture, particularly in respect of their stiffness and consequent coolness, on account of which they are much preferred by the Chinese to European manufactures. Amongst the number of these fabrics, which are manufactured at Quang Tong, where they are known by the generic appellation of *ha-pou* (in Mandarin *cha-pou*), are those known in France by the name of *Canton cambric,* and in England *grass-cloth,* and called by the inhabitants of Canton *yun-chest-yaŏ-ha-pou,* when in a raw or unbleached state, and *piou-pa-yaŏ-ha-pou,* when bleached; which, being literally translated, means *fine unbleached summer fabric,* or *fine light bleached summer fabric.* Besides this kind of cambric, of which there are infinite varieties as regards fineness of texture and consequent value, other fabrics of a coarser texture are manufactured, called *tso-ha-pou,* which means, literally, *coarse summer fabrics.*

The substance from which these various kinds of fabrics are made, is obtained from the bark of two kinds of textile plants, cultivated on a large scale at a distance of 30 or 40 leagues N. E. of Canton, in the district of Si-Nam, and particularly at the small town of Hoang-Tchiang; they are known in the country by the name of *lo-ma* (cannabis indica?) and *tsing-ma* (corchorus?)

From the first, *lo-ma,* which is also cultivated in the environs of Canton and Macao, coarse fabrics are produced; from the second, *tsing-ma,* fine fabrics or cambrics are manufactured. Some fabrics are made by employing the *lo-ma* for the weft, and the *tsing-ma* for the warp.

The following is the method of cultivating the *loma*:—After having manured the ground, it is well broken up, and in the rainy season, at the commencement of spring, the grain is sown very sparingly, and near the surface. The ground is then covered with a thick layer of straw or dried herbs; and if it is a dry season the ground is watered in such a manner that the water, dripping through the straw, &c., may act gently upon the earth without any danger of washing away the seed. When the plant appears above ground, the straw, &c., is removed; and after being suffered to grow a little longer, the plants are thinned, so as to leave them standing at a distance of five inches apart. In about eight months, the plants will have attained maturity, and as they are of the class *diœcia*, they are treated in the same manner as hemp, *i. e.*, the male plants are first removed, after fecundation, and a fortnight or three weeks afterwards the female plants are gathered. The plant grows to a height of five or six yards, and is about two-thirds of an inch in diameter at its base.

In order to extract the thread, the plant is cut round outside near the root, and the outside, thus cut, is easily stripped off. It is then soaked in water for two days, and afterwards dried in the sun, and separated by hand into long threads, which are prepared for use in a manner similar to hemp.

Tsing-ma is cultivated in the same manner as the *lo-ma*, but it does not require so high a temperature. In order to prepare the thread, the plant is to be tied up while green into bundles of from three to four feet in height, and about eighteen inches in thickness, and placed upright over a large shallow iron vessel filled with water, the edges of which are raised by means of a lattice-work of bamboo covered with clay. The furnace is then lighted and the water heated to the boiling point for several hours, until the plant is completely cooked by the steam; it is afterwards well dried in the sun, and soaked in cold water, and by dividing it near the root, the bark or covering may be easily stripped off. It is then split and divided into very fine threads by means of combs, &c.. The thread is made without any twisting, by simply joining the ends of threads of equal dimensions.

It is probable that these two qualities of hemp might be cultivated very well in Algiers, more especially in the plain of Mitidja, and also in the south of France. The naturalization of this plant would be the more desirable, as a well-known English manufacturer, Mr. Hargrave, announced in the *London Mail* of 24th June, 1845, that he had made a great many experiments on spinning *tsing-ma* thread by machinery, and the result was very satisfactory, as the thread produced was much finer and stronger than that obtained from any European plants, and that he was then manufacturing from it fabrics as fine as French cambric.

In the spring of this year, M. Itier caused these two plants to be sown at Montpelier, Perpignan, Grenoble, Lyons, and Paris; and it is to be regretted that the Government has not caused any to be sown in Algiers.

II. *On the manufacture of thread or yarn, and fabrics, from abaca, nipis, and pina, indigenous to Manilla.*

Abaca or Manilla hemp is the produce of a banana tree, indigenous to the Phillippine Islands, and known to botanists by the name of *musa troglodytarum*. It is cultivated, on a large scale, in the provinces of Camarines Norte, Camarines Sur, Albay, (Island of Luçon), Samar, and Leyte,—Islands bearing those names.

For this purpose, the sides of mountains, newly cultivated, are preferred. The young plants, after having their tops cut off, are placed at a distance of fourteen feet apart, in holes about six inches square. During the first two years this plantation only requires weeding twice a year, in order to destroy the noxious weeds, which would soon kill the plants; in the course of the third year the largest stalks are cut. As the banana tree possesses the property of continually putting forth fresh shoots, the plantations will last for any length of time.

In order to prepare the *abaca*, the banana top is split into several long strips, which are passed between a thick plank placed in a horizontal position, and a metal blade pressed forcibly upon it; the strip is drawn through, and in this manner scraped, and the fibres deprived of the pulpy integuments; they are afterwards dried in the sun, and are easily separated; it then only remains to sort them and tie them together.

It is calculated that a foot of banana will furnish from ten to twelve ounces of thread, and that one workman can prepare 50 lbs. of abaca *per diem*.

Before the year 1823, the production of abaca was of very little importance; not more than 200 lbs. per annum were exported. The quantity exported now is upwards of 2000 tons. Ropes, cordage, and various fabrics, are made with abaca. There is a rope manufactory at Manilla, worked by steam, which furnishes a large quantity of ropes, &c., for maritime purposes. Cordage made from this substance does not shrink from damp; but this advantage is counter-balanced by several disadvantages, in consequence of which the abaca cordage is much inferior to that manufactured from hemp; for instance, the former is never so flexible nor so strong as the latter.

The abaca fabrics are a kind of transparent cloth, somewhat stiff, light, and very cool to the touch, from which the *Tagals* make colored shirts. These fabrics are generally striped, and often printed; they might be used with advantage for sifting and straining purposes. Abaca thread does not require to be spun; it is used as produced by nature, and simply joined together end to end. The threads are tied together in bundles, and beaten, for the purpose of softening them, and afterwards bleached by immersion, during twenty-four hours, in lime-water, and dried in the sun; they are then in a fit state for weaving.

A fabric, known under the name of *medriniac*, is also manufactured from unbleached abaca thread, which may be advantageously used for linings of clothes, &c.: this fabric is extensively used for these purposes in Spain.

From the finest abaca thread a pretty stuff, called *jusi* (houssi), striped with various colored silks, is manufactured. It is sold at the rate of two piastres every twenty tares, or about six-pence per yard.

Pina is a thread obtained from the leaf of the ananas or pine-apple; it is prepared in the same manner as abaca thread, great care being observed in picking or sorting before uniting them This thread may be dyed.

Nipis, or vegetable silk, is a filament produced from the leaf of the *nipis* palm tree. A species of pina, of inferior quality, is made from this fibre.

The stuff known at Manilla by the name of *sinamaye* is manufactured from pina and silk, forming stripes of various sizes and colors. Ladies' dresses are made from it, and also fine shirts and stomachers.

III. *On the manufacture of enamelled copper, at Canton.*

When the copper has been shaped into the desired form, it is to be cleaned, but not scoured, and afterwards wetted with water, and sprinkled with the enamelling composition intended to form the ground, which may be either white or colored: the article is then put into a muffle heated by means of dry Nankin coal (this is found to be the best fuel). When the ground has been produced, the article is withdrawn from the muffle and covered with an iron bell, in order that it may cool slowly: the ground may be then ornamented in the same manner as porcelain, and again passed through the muffle.

Several specimens of enamel, and colors upon enamel, have been deposited by me at the royal manufactory at Sevres, in order that the manufacturers in this kingdom may be made acquainted with the art.

IV. *Method of preserving eggs in China.*

It is customary in China to salt eggs, and by this means to preserve them for several years; the method of doing this is very simple:—A saturated solution of sea-salt is made, and the eggs are placed therein and suffered to remain until they sink to the bottom; they will then be sufficiently impregnated with salt, and may be taken out, left to dry, and packed in cases. These eggs, which are generally eaten boiled hard, are excellent, and they will be found to be salted to the degree most agreeable to the palate.

Scientific Adjudication.

COURT OF COMMON PLEAS.

(Sittings in Banco, July 6, 1846.)

This morning Mr. Justice Coltman, Mr. Justice Maule, and Mr. Justice Cresswell, Lord Chief Justice Tindal being absent from illness, sat to deliver judgment on the following case.

GAMBLE *v.* KURTZ.

The action had been tried before Mr. Justice Coltman at the sittings after last Hilary Term,* and was brought for the alleged infringement of the plaintiff's patent in a certain apparatus for the production of sulphate of soda and muriatic acid. The pleas put in by the defendant were, first, not guilty; secondly, that the plaintiff was not the inventor of the apparatus; thirdly, that the invention was not new, as described in the specification; together with several others, not material to mention here. At the trial it was proved that common salt and sulphuric acid were the agents used in the apparatus in question; the effect of bringing the acid into contact with the salt being to produce therefrom muriatic acid, in combination with soda, which latter, when separated, became sulphate of soda. Before the introduction of the plaintiff's invention, the apparatus in use were first egg-shaped pots and iron cylinders, afterwards a reverberatory furnace, composed of brick, and subsequently Lutwyche's patent, which contained both an iron decomposer and brick roaster, heated by separate fires. As an improvement on all these, the plaintiff, on the 11th of March, 1839, obtained a patent for his invention; the construction of his apparatus was as follows:—At each end of an almost square body of brickwork an iron decomposing retort was placed, and in the centre a roasting or finishing furnace, between which and the two former there was a connection by means of a small door. Under each of these compartments there was a separate and distinct fire-place. The common salt, being put in at either of the end retorts, through a side aperture, was brought in contact with sulphuric acid, supplied through the same aperture, at a temperature a little above boiling water, from 200° to 300° Fah., by the absorption of which it became decomposed. After having been turned several times by means of a rake, the salt so decomposed was then pushed through the small connecting door into the roasting furnace, where it became subjected to an increased temperature, amounting to a red heat, or nearly so. In that state, after having been again similarly raked, the muriatic acid was given off in a gaseous form, the remaining deposit being sulphate of soda. The gas so evolved passed through certain tubes, and was conveyed into three cisterns, arranged one above another, and filled with small pebbles or pieces of glass, surrounded by water—the latter being supplied from a reservoir placed above all, and trickling through a pipe from one cistern to another. So soon as the gas came in contact with the cold surface presented by the pebbles and water, it was condensed, and, being absorbed, became liquid muriatic acid. The strength of this acid increased in its descent from the highest cistern, as the supply of gas into the second and third cisterns was condensed and absorbed by the action not of water merely, but by a weaker description of acid trickling from the cistern immediately above; so that three different strengths could at any time be obtained. This apparatus was stated to be different in principle from, and to possess many advantages over, the former; but the main distinctions consisted in its having distinct fires for the separate compartments, acting on the bottom and sides of the retorts, the smoke being carried off in a different channel from that through which the acid passed; and, further, that two decomposing retorts, separate from the roasting furnace, prevented any delay for the purpose of cooling. The process of condensing and preparing the acid was also stated to be quite a novel and important improvement. A model of the defendant's apparatus was produced in court, and the witnesses described it as being substantially the same as the plaintiff's; it, however, contained a brick and not an iron roaster. The plaintiff's specification was also put in as evidence, by which he claimed iron retorts worked in connection with each other, and constantly maintained at an elevated temperature.

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* See Vol. 28, page 136, Conjoined Series.

On behalf of the defendant it was proved by several witnesses, practically acquainted with the manufacture in question, that the principle of having the decomposer and roaster in separate compartments, with an aperture between, and separates fires, was not new. They further stated, that the sulphate of soda, made in iron roasters, was not fit for some purposes, such as the finer kinds of glass, as it contained more or less iron, and the acid not so well disengaged; and that there was a difference in price between it and brick-furnace soda of about £2 per ton. The expense, too, of brick-roasters was considerably less than that of iron.

Upon this evidence the jury had found for the plaintiff on the plea of not guilty, and specially that, assuming the models to be correct, there had been an infringement by the defendant; secondly, that the invention of two separate chambers or furnaces was not new, but that the plaintiff's mode of connecting the same was new; thirdly, that the specification was sufficient; and, fourthly, that the process patented was an improvement on the old system of producing sulphate of soda. Each party had obtained leave to enter a verdict in his favor on this special finding; and in Easter Term last, cross rules had been accordingly granted and afterwards argued.

Mr. Justice Coltman said that this was an action for an infringement of the plaintiff's patent, granted to him for an improvement in an apparatus for the decomposition of common salt in the manufacture of sulphate of soda, chlorine, and chlorides. The defendant pleaded "not guilty;" that the plaintiff was not the inventor; and that the invention was not new, as described in the specification. There were several other pleas, which it was not necessary to mention. The plaintiff proved that the apparatus formerly used for making sulphate of soda consisted of a common reverberatory furnace, composed of brick, and at a subsequent period "Lutwyche's patent" came into operation. This latter process consisted in the use of an iron furnace for decomposing, and a brick furnace for roasting. The plaintiff stated, in his specification, that, instead of brick furnaces hitherto employed in the decomposition of common salt, and for its conversion into sulphate of soda, he had found that iron retorts, worked in connection with each other, and constantly maintained at an elevated temperature, might be advantageously used. The words of the specification were—"I do not claim the exclusive use of iron retorts, but I claim, as my invention, iron retorts (one for decomposing and the other for roasting) worked in connection with each other." For the plaintiff a good deal of evidence was adduced to shew that the use of two separate chambers or furnaces, with distinct fires, was not known previous to his invention. The defendant proved that the principle of employing a decomposer and roaster in separate compartments was not new, and that the mode of producing sulphate of soda by the use of iron retorts was not an improvement in the manufacture. Upon this evidence the jury found for the plaintiff on the issue of not guilty, and there was a special finding to the effect that the invention of two separate chambers or furnaces was not new, but that the plaintiff's mode of connecting the same was new. The result of this verdict was that each party had obtained leave to move for a verdict to be entered in his favor. Cross rules were accordingly granted in Easter Term, and in Trinity Term the case came on for argument. The court were of opinion that the verdict, on the plea of not guilty, must stand for the plaintiff. The other question depended upon what was the true nature of the plaintiff's claim as the inventor. The jury found that, if he claimed for two separate chambers, the invention in that respect was not new, but that the plaintiff's mode of connecting the same was new. It appeared to them (the learned judges) that no reasonable doubts could be entertained as to the claim made by the plaintiff. Looking at the terms of the specification, the court could not say that the claim was for separate chambers worked in connection with each other. That the plaintiff so understood the claim was clear from the terms of the disclaimer which appeared in evidence. The effect of this would be, that the verdict upon this special finding must be entered for the defendant on the second and third issues, and the plaintiff's rule must be discharged altogether. Verdict entered accordingly.

REPORT OF AMERICAN PATENTS.

BY MR. C. M. KELLER.

From the "Journal of the Franklin Institute."

To Reid R. Throckmorton, *of Brooklyn, N. Y., for improvements in the machine for planing, sawing, tongueing, grooving, and rebating boards.*

In this machine the planing or facing-wheel is similar in principle to what is known as the Bramah machine, and as it is simply used for facing or smoothing the surface of the board, a large circular veneering saw is first used to reduce the boards to the required thickness. The other features are fully pointed out in the following—

Claim:—"What I claim therein as new, and desire to secure by letters patent, is,

"1st. The combination of the veneer saw with the planing-wheel, for the purpose of reducing the plank or board to a uniform thickness:—and, "2nd. I also claim the combination of the veneer saw, for reducing the plank or board to a uniform thickness, with the tongueing and grooving-wheels, as herein described.

"3rd. I also claim the manner of forming the tongue by the two tongueing-wheels, having pointed cutter-irons with two cutting edges, the one cutting the side of the tongue, and the other the shoulder of the same; the shafts of the said wheels standing at an angle of forty-five degrees, more or less, and crossing each other at or about a right angle.

"4th. I also claim, in combination with the tongueing-wheels, the separate wheel for rounding the tongue.

"5th. I also claim the use of one of the tongueing-wheels (the other being removed) for cutting a rebate upon the edge of the plank where they are intended for over-lapping each other, as in weather-boarding.

"6th. I also claim, in combination with the planing, tongueing, and grooving-wheels, the wheel for forming a bead upon the edge of the boards.

"7th. I also claim the stationary knives for cutting off the stub-shot from the end of the plank, in combination with the feed-rollers."

To CHARLES F. OLIVER *and* GEORGE W. JACKSON, *of Lynn, Essex county, Massachusetts, for an improvement in piano-fortes.*

THIS improvement is for the employment of a supplementary string or strings, struck by the same hammer as the usual string, so that by the use of a damper, the supplementary strings, which are tuned an octave higher, may be sounded or not, at pleasure.

Claim:—"Having thus set forth our invention, we shall claim one or more supplementary strings, damper, and bridge (or other analogous contrivance for supporting the strings and checking their vibrations, as above set forth), in combination with the string or strings, and hammer beneath the same; the supplementary string being arranged, tuned, and operating, with respect to the strings of a note, and struck by the same hammer, substantially in the manner above specified. We also claim the making the pad of the hammer-head of different degrees of elasticity, or harder in that part of it directly beneath, and which acts upon the supplementary string, than it is in the part or parts beneath, and which strike the other strings; the same being for the purpose above explained."

To FREDERIC WALTHER, *of Winchester, Frederic county, Va., for an improvement in the pump.*

IN this pump there are two pistons attached to one piston rod (one at each end of the rod) working within one cylinder, the piston rod being operated by a cross head attached to the middle of the rod, and passing out through slots in the cylinder and between the two pistons, to receive the connecting rods.

Claim:—"I would observe that I do not claim the pump action, nor the working of two pumps together by one piston rod, but what I do claim as new, and desire to secure by letters patent, is the working of two pumps upon one rod within one cylinder, in the manner set forth—the cross-piece attached to the piston-rod, and passing out through the slots in the cylinder, in the manner and for the purpose herein described."

To Samuel Taylor, *of Cambridge, and* Abbot R. Davis, *of Boston, Mass., for a machine for filling brush blocks with bristles.*

The bristles are laid in a hopper and over a hole at the bottom thereof, from which a tube extends to the brush-block placed below. A gauge punch, attached to a vertically sliding-rod, moves up and down in this tube, and (the end being forked) at every downward movement it carries a given quantity of bristles through the tube into one of the holes in the block; and in moving up to take another charge, the bristles are prevented from being forced down by means of weighted cords passing over them on each side of the gauge punch.

Claim:—"Having thus described our inventions, we shall claim the combination of the gauge punch with a hopper arranged beneath it, and having a guide-tube or other suitable contrivance of like character adapted to it,—the whole being arranged and operated substantially, as above described.

"Also the manner in which the bristles are fed beneath the gauge punch, as fast as is necessary, when others are removed by the same from the hopper; viz., by means of the weighted strings adapted to the hopper and frame of the machine, as above specified.

"We also claim, in combination with the weighted strings, elevating the hopper when the gauge punch rises upwards; the same being for the purpose of drawing the strings over the bristles, and thereby ensuring their movement beneath, and into the fork of the gauge punch."

To George Upham, *of Hebron, Licking county, Ohio, for an improved method of shutting out the miller or bee-moth, from the bee-hive or palace.*

The patentee says:—"The nature of my invention consists in providing means of shutting out from the hive or bee-palace the miller or bee-moth at night, and of opening it in the morning (that the bees may resume their labour), by connecting with the bee-hive or palace the roost of chickens or other fowls (or, in other words, the *coop* of chickens or other fowls), so as to convert the *roost* (whether it be a pole, a rope, or any other thing upon which fowls roost) into a lever or pulley, either by hanging it, or by placing it upon a fulcrum, or in any other manner by which it can be used as a lever or pulley, or be made the means of shutting or opening the bee-hive or palace, without that close attention which would be required of individuals shutting and opening the same at a proper time."

Claim:—"What I claim as my invention, and desire to secure by letters patent, is the connection of the roost, whether of chickens or other fowls, with the bee-hive or palace. The use of the roost as a lever or instrument, by which the passage or passages of the bees (into and out of their hives) are shut at night, and opened in the morning; or any other manner of using the roost of fowls, whether the roost is a pole or any other thing."

LIST OF REGISTRATIONS EFFECTED UNDER THE ACT FOR PROTECTING NEW AND ORIGINAL DESIGNS FOR ARTICLES OF UTILITY.

1846.

June 25. *John Holloway*, of Birmingham, for a buckle-chape.

27. *Francis Molineux*, of 8, Paragon, Hackney, for an improved trouser fastening.

29. *John Cook & Septimus Battam*, of 60, Tottenham-court-road, for a fastening for trouser-straps.

July 1. *John Chambers*, of Birmingham, for a tap.

2. *John Gedge*, of 4, Wellington-street South, London, for millstones for purifying grain.

3. *Thomas Morris*, of 5, Albert-road, Regent's-park, for a hook and eye.

4. *Thomas Morris*, of 5, Albert-road, Regent's-park, for a flooring-cramp.

4. *Thomas Morris*, of 5, Albert-road, Regent's-park, for a lock-up label case.

4. *Thomas Pool*, of Accrington, Lancashire, for a truss.

6. *Maximilian Schenkenberg*, of 369, Strand, London, for a brake for carriages.

7. *Siddons & Walker*, of Willenhall, for a lock.

9. *Richard Garrett*, of Leiston-works, near Saxmundham, Suffolk, for a drill.

July 10. *John Piper*, of 92, High-street, Shoreditch, London, for a tea-kettle.

10. *Phillips Fowler Hodgkins*, of 12, Snow-hill, Birmingham, for a hand dibbler.

15. *William Furnival*, of Hanley, Staffordshire, earthenware manufacturer, for a design for the inside of a china or earthenware candlestick, with a slide therein.

15. *Samuel Chambers*, of 92, Aston-street, Birmingham, gas lamp and chandelier manufacturer, for a meridian light.

18. *Smith & Kemp*, of 165, Brearley-street, Birmingham, button manufacturer, for a round bar button.

18. *William Wharton*, Superintendant at the Euston-square Station of the London and Birmingham Railway, London, for a carriage-spring.

18. *James Siddons*, of Willenhall, for an iron and iron handle.

21. *Galloway & Co.*, of Manchester, for a screw-jack.

21. *John Legg*, of St. Philip-street, Bath-road, Cheltenham, for a hydraulic rising main.

21. *Emma Frances Reynolds*, of No. 7, Ormond-terrace, Cheltenham, for a shirt.

21. *James Dredge*, of Bath, civil engineer, for an improved furnace bar.

22. *William and George Ashford*, of Masshouse-lane, Birmingham, for a substitute for a buckle.

24. *William De la Rue*, of Bunhill-row, Middlesex, for a smoking-pipe.

24. *Joshua Harrison*, of Park-street, Derby, stove-grate manufacturer, for an economical Derby range, or improved cooking apparatus.

25. *Edward Fox*, of 15, Penrhyn-street, Liverpool; and James Brown Carson, of Drury-lane, Liverpool, for an alarum.

27, *William Brown*, of Preston, in the county of Lancaster, for an under carriage for two-wheeled vehicles.

28. *Shoolbred Loveridge, & Co.*, of Wolverhampton, for parts of a shower-bath.

List of Patents

That have passed the Great Seal of IRELAND, from the 22nd June to 20th July, both inclusive.

To Pierre Armande le Comte de Fontainemoreau, 15, New Broad-street, London, for an improved mode of constructing certain parts of the harness of horses and other beasts of burden,—being a communication.—Sealed 25th June.

Samuel Cunliffe Lister, of Manningham, near Bradford, in the county of York, manufacturer, for improvements in preparing and combing wool.—Sealed 3rd July.

Peter Taylor, of Hollinwood, near Manchester, mechanist, for certain improvements in the machinery for propelling vessels, carriages, and machinery; parts of which improvements are applicable to drawing and propelling fluids; also improvements in the construction of vessels.—Sealed 4th July.

List of Patents

Granted for SCOTLAND, subsequent to June 22nd, 1846.

To John Davie Morries Stirling, of Black Grange, in North Britain, for certain new alloys and metallic compounds, with a method of welding the same, and other metals.—Sealed 25th June.

John Mercer, of Oakenshaw, in the county of Lancaster, and John Greenwood, of Church, in the same county, chemists, for certain improvements in dyeing and printing Turkey-red and other colors.—Sealed 26th June.

Peter Fairbairn, of Leeds, for certain improvements in atmospheric railways,—being a foreign communication.—Sealed 30th June.

Elijah Galloway, of 14, Buckingham-street, Strand, London, civil engineer, for improvements in locomotive engines.—Sealed 2nd July.

William Henry Burke, of Tottenham, London, for certain improvements in the manufacture of fabrics, which may, if required, be made air and waterproof; a part of the materials employed herein, when combined with other matters, being intended to produce coverings for vessels of capacity.—Sealed 3rd July.

John Tatham, of Rochdale, in the county of Lancaster, machine-maker; David Cheetham, of the same place, machine maker; and John Wallace Duncan, of Manchester, Gent., for certain improvements in machinery or apparatus to be used in the preparation and spinning of cotton and other fibrous substances. Sealed 3rd July.

Antoine Perpigna, of Paris, Advocate, for improvements in regulators for qualifying the actions of mechanical powers,—being a foreign communication.—Sealed 6th July.

George Leach Ashworth, of Rochdale, cotton spinner, and Wilson Crossley, of the same place, manager, for certain improvements in machinery or apparatus for preparing and spinning cotton and other fibrous substances.—Sealed 7th July.

William Pidding, of Wigmore-street, London, for an improved process for preserving the flavor of coffee and cocoa, or of any preparations thereof, from the effects of the atmosphere.—Sealed 8th July.

Charles Hancock, of Grosvenor-place, London, for certain improvements in the manufacture of gutta-percha, and its applications alone and in combination with other substances.—Sealed 10th July.

Michael Borgognan, of No. 15, New Broad-street, London, for certain improvements in producing artificial basaltic lavas,—being a foreign communication.—Sealed 13th July.

Charles Chinnock, of Seymour-place, Little Chelsea, for improvements in the construction and methods of extending and compressing articles of furniture and domestic use; also applicable to cutlery, workmen's tools, window blinds, shutters, and similar useful purposes.—Sealed 16th July.

Peter Taylor, of Hollinwood, near Manchester, machinist, for certain improvements in machinery for propelling vessels, carriages, and machinery; parts of which improvements are applicable to drawing and propelling fluids; also improvements in the construction of vessels.—Sealed 21st July.

Nicholas François Corbin Desboissierres, of Rue St. Pierre, Montmartre, in the kingdom of France, for improvements in preparing and burning fuel.—Sealed 21st July.

Gustaf Victor Gustafsson, late of Sweden, but now of Warren-street, Fitzroy-square, London, engineer, for certain improvements in steam-engines.—Sealed 22nd July.

New Patents
SEALED IN ENGLAND.
1846.

To Joseph Storer, of Stanhope-street, Mornington-crescent, musical instrument maker, for improvements in organs, seraphines, and other "free reed" instruments; part of which improvements are applicable to piano-fortes,—being partly a communication. Sealed 27th June—6 months for inrolment.

John Davie Morries Stirling, of Black Grange, in North Britian, Esq., for certain new alloys and metallic compounds; with a method of welding the same and other metals. Sealed 29th June—6 months for inrolment.

François Stanislas Meldon de Sussex, of Millwall, Middlesex, manufacturing chemist, for improvements in the manufacture of soda and potash. Sealed 29th June—6 months for inrolment.

Thomas Lane Coulson, of Assington Hall, Assington, in the county of Suffolk, Esq., for improvements in the construction of chairs. Sealed 29th June—6 months for inrolment.

Charles Payne, of Whitehall Wharf, Cannon-row, Westminster, Gent., for improvements in preserving vegetable matters. Sealed 29th June—6 months for inrolment.

William Mill, of Newhall-street, Birmingham, manufacturer, for improvements in instruments used for writing and marking, and in the construction of inkstands. Sealed 29th June—6 months for inrolment.

Moses Poole, of the Bill Office, London, Gent., for improvements in regulating the velocity of steam-engines,—being a communication. Sealed 29th June—6 months for inrolment.

Joseph Moreland, of Old-street, Middlesex, copper, still, and boiler setter, oven builder, constructor, and designer of furnaces generally, for improvements in setting and fixing coppers, stills, and boilers, and in the construction of furnaces. Sealed 29th June—6 months for inrolment.

William Smith, of the City of London, gas-meter manufacturer, for certain improvements in gas-meters,—being a communication. Sealed 29th June—6 months for inrolment.

Antoine Perpigna, of Paris, advocate, for improvements in regulators for qualifying the actions of mechanical powers,—being a communication. Sealed 29th June—6 months for inrolment.

John Tatham, of Rochdale, Lancashire, machine-maker; David

Cheetham, of the same place, machine-maker; and John Wallace Duncan, of Manchester, in the same county, Gent., for certain improvements in machinery or apparatus to be used in the preparation and spinning of cotton and other fibrous substances. Sealed 29th June—6 months for inrolment.

Joseph Seraphin Faucon, of Rouen, in the kingdom of France, banker, for improvements in combining materials to be employed in fulling cloth. Sealed 29th June—6 months for inrolment.

Sir James Caleb Anderson, of Buttevant Castle, in the county of Cork, Bart., for certain improvements in obtaining motive power, and in applying it to propel carriages and vessels; and to the driving of machinery. Sealed 29th June—6 months for inrolment.

Thomas Parkin, of Hoxton, in the county of Middlesex, engineer, for improvements in the means of giving motion to locomotive carriages with or without bearing wheels attached to them, and in the construction of ways, passages, and roads, on which the said carriages are to travel. Sealed 29th June—6 months for inrolment.

Charles Clark, of Cornhill, in the City of London, merchant, for certain improvements in the pyro-hydro-pneumatic apparatus for generating, purifying, and condensing steam and other vapours, and for obtaining vegetable extracts. Sealed 29th June—6 months for inrolment.

James Hastings, now residing at Havre, in the kingdom of France, for an improved machine for making bricks, tiles, quarries, and cornice ornaments. Sealed 30th June—2 months for inrolment.

William Clarke, of Hoxton, in the county of Middlesex, machinist, for certain improvements in weighing machines, steelyards, and scale beams. Sealed 30th June—6 months for inrolment.

James Thompson, of Liverpool, engineer, for certain improvements in machinery or apparatus for obtaining motive power, part or parts of which improvements are applicable to other useful purposes. Sealed 6th July—6 months for inrolment.

Peter Ward, of Oldbury, in the county of Worcester, chemical manager, for improvements in the manufacture of certain salts of soda and magnesia. Sealed 6th July—6 months for inrolment.

Richard Wright, of Hermitage-terrace, Bow, sugar refiner, for improvements in refining sugar. Sealed 6th July—6 months for inrolment.

George Downing, of Birmingham, steel-pen tool-maker, for a certain improvement in the manufacture of pen-holders. Sealed 6th July—6 months for inrolment.

Frederick Ransome, of Ipswich, engineer, and Charles Crabb Blair Warren, of Little Horksley, in the county of Essex, clerk, for certain improvements in the manufacture of bricks, tiles, pipes, and other articles composed of plastic materials; and in the preparation of plastic materials to be used for such purposes. Sealed 6th July—6 months for inrolment.

John Palmer de la Fons, of Carlton Hill, St. John's Wood, Esq., for improvements in the manufacture of locks and other fastenings. Sealed July 6th—6 months for inrolment.

William M'Gary, of Hoxton, for improvements in lamps, lamp-glasses, candles, and shades. Sealed 6th July—6 months for inrolment.

Thomas Woolley, of Nottingham, piano-forte manufacturer, for improvements in piano-fortes. Sealed 8th July—6 months for inrolment.

Robert Beart, of Godmanchester, farmer, for improvements in tilling land. Sealed 10th July—6 months for inrolment.

William Middlemore, of Birmingham, manufacturer, for a certain improvement or certain improvements in saddles. Sealed 13th July—6 months for inrolment.

Lawrence Hill, jun., of Glasgow, civil and mechanical engineer, for improvements in the manufacture of iron for building ships and boats and other vessels, and in the construction of ships and boats and other vessels, and in instruments, machinery, and apparatus to be used in the said construction,—being a communication. Sealed 14th July—6 months for inrolment.

Charles Frederick Bielefeld, of Wellington-street, Strand, papier-maché manufacturer, for improvements in the making of moulds or dies, used in the manufacture of papier-maché and other matters, and in moulding or forming articles from certain plastic materials. Sealed 14th July—6 months for inrolment.

Watson Pattinson, of Felling, near Gateshead, in the county of Durham, manufacturing chemist, for improvements in the manufacture of chlorine. Sealed 14th July—6 months for inrolment.

Odert Gripenberg, of Finland, in the kingdom of Russia, Gent., for improvements in machinery for sowing grain and other seed. Sealed 14th July—6 months for inrolment.

George Knight, of the town and county of the town of Southampton, wine merchant, for certain improvements in excavating and dredging; also in the formation of permanent and temporary harbours, canals, bridges, docks, and other similar works, and the apparatus to be employed therein. Sealed 14th July—6 months for inrolment.

William Seed, of Preston, in the county of Lancaster, machine-maker, for certain improvements in machinery or apparatus for preparing, slubbing, and roving cotton and other fibrous substances. Sealed 14th July—6 months for inrolment.

Gustaf Victor Gustafsson, late of Sweden, but now of Warren-street, Fitzroy-square, engineer, for certain improvements in steam-engines. Sealed 14th July—6 months for inrolment.

Sir Samuel Brown, Knight of the Hanoverian Guelphic Order, and Captain in Her Majesty's Navy, of Blackheath, in the county of Kent, for improvements in railways and carriages to run on railways, and in the constructing and arming ships or vessels. Sealed 14th July—6 months for inrolment.

David Yoolow Stewart, of Montrose, in the kingdom of Scotland, for improvements in moulding iron and brass. Sealed 14th July—6 months for inrolment.

Thomas Bonser, of Merton, Surrey, farmer, and Edwin Watkins Williams Wynn Pettitt, of York-road, Lambeth, civil engineer, for certain improvements in machinery for tilling land. Sealed 15th July—6 months for inrolment.

Thomas Symes Prideaux, of Southampton, Gent., for improvements in machinery for excavating. Sealed 15th July—6 months for inrolment.

William Thomas, of Cheapside, for certain improvements in frames, locks, and fastenings for carpet bags and purses; parts of said improvements being applicable to all other locks,—being a communication. Sealed 15th July—2 months for inrolment.

William Thurman, of the town and county of Nottingham, hosier, for certain improvements in the manufacture of gloves, stockings, and other hosiery goods. Sealed 18th July—6 months for inrolment.

James Napier, of Shacklewell, Middlesex, operative chemist, for improvements in smelting copper ores. Sealed 20th July—6 months for inrolment.

James Henry Dickson, Esq., Captain, Half-pay, of Cheltenham, in the county of Gloucester, for certain improvements in saddles. Sealed 23rd July—6 months for inrolment.

François Henri Bickés, of Mayence on the Rhine, in the Grand Duchy of Hesse, Gent., for improvements in distillation. Sealed 23rd July—6 months for inrolment.

John Tulloh Osborn, of Demerara, now residing in London, Esq., for certain improvements in power machines, or machinery, for tilling, draining, and otherwise cultivating land; and in the mode or modes of working the same. Sealed 23rd July—6 months for inrolment.

Peter Claussen, of Leicester-square, Gent., for improvements in methods of, or apparatus for, propelling and exhausting, and compressing air and aeriform bodies. Sealed 23rd July—6 months for inrolment.

Charles William Firchild, of Leamington, in the county of Warwick, Gent., for a new engine for obtaining rotary motion. Sealed 23rd July—6 months for inrolment.

Edward Hammond Bentall, of Heybridge, in the county of Essex, iron-founder, for improvements in implements for ploughing land and clearing land of weeds. Sealed 23rd July—6 months for inrolment.

Augustus William Hillary, of No. 66, Cadogan-place, Chelsea, at present residing at 146, Avenue des Champs Elysees, in the city of Paris, Esq., for improvements in the manufacture of gas. Sealed 23rd July—6 months for inrolment.

Alfred Vincent Newton, of the Office for Patents, 66, Chancery-lane, mechanical draughtsman, for certain improvements in the manufacture of sugar,—being a communication. Sealed 23rd July—6 months for inrolment.

Harold Crease, of Brixton Hill, paper-stainer, for certain improvements in the preparation of paints and colors for decorative and other similar purposes. Sealed 23rd July—6 months for inrolment.

John Boyes, of Mincing-lane, in the city of London, Gent., for improvements in machinery for thrashing and winnowing grain and seeds,—being a communication. Sealed 23rd July—6 months for inrolment.

George Henry Fourdrinier, of Hanley, in the county of Stafford, paper-maker, for improvements in preparing the materials used in manufacturing earthenware and china, and printing the designs for ornamenting the same. Sealed 23rd July—6 months for inrolment.

Thomas Bell, of Don Alkali Works, South Shields, for improvements in smelting copper ore. Sealed 23rd July—6 months for inrolment.

CELESTIAL PHENOMENA FOR AUGUST, 1846.

D.	H.	M.	
1			Clock before the ⊙ 6m. 3s.
			☽ rises 2h. 14m. A.
			☽ passes mer. 6h. 53m. A.
			☽ sets 11h. 26m. A
5			Clock before the sun, 5m. 44s.
—			☽ rises 6h. 7m. A.
—			☽ passes mer. 10h. 45m. A.
—			☽ sets 2h. 14m. M.
	13	34	♃'s third sat. will im.
7	1		☽ in Perigee
7	6		Ecliptic oppo. or ○ full moon.
	14	47	♃'s first sat. will im.
7	19	33	♄ in conj. with ☽ diff. of dec. 6. 22. S.
9			Occul. 21 Piscium, im. 11h. 14m. em. 12h. 20m.
8	19	23	♂ in Aphelion
10			Clock before the sun, 5m. 8s.
—			☽ rises 8h. 49m. A.
—			☽ passes mer. 2h. 34m. M.
—			☽ sets 8h. 59m. M.
	19	34	♅ in conj. with the ☽
	20	3	☿ stationary
13	10	51	☽ in □ or last quarter
14	15	31	♃'s second sat. will im.
14	16	40	♃'s first sat. will im.
—			Occul. δ2 Tauri, im. 13h. 1m. em. 13h. 54m.
15			Pallas stationary
—			Clock before the sun, 4m. 17s.
—			☽ rises 11h. 46m. A.
—			☽ passes mer. 6h. 53m. M.
—			☽ sets 2h. 48m. A.
	3	41	♃ in conj. with the ☽ diff. of dec. 2. 38. N.
17			Mercury R. A. 10h. 34m. dec. 4. 1. N.
—			Venus R. A. 7h. 43m. dec. 21. 7. N.
—			Mars R. A. 10h. 17m. dec. 11. 47. N.
—			Vesta R. A. 9h. 9m. dec 18. 47. N.
—			Juno R. A. 14h. 41m. dec. 3. 35. S.
—			Pallas R. A. 0h. 58m. dec. 0. 21. N.
—			Ceres R.A.3h.53m. dec.12. 31. N.
—			Jupiter R. A. 4h. 46m. dec. 21. 37. N.
—			Saturn R. A. 22h. 1m. dec. 13. 46. S.
—			Georg. R. A. 0h. 52m. dec. 4. 52. N.
—			Mercury passes mer. 0h. 52m.
—			Venus passes mer. 22h. 2m.
—			Mars passes mer. 0h. 35m.
—			Jupiter passes mer. 19h. 2m.
—			Saturn passes mer. 12h. 17m.
—			Georg. passes mer. 15. 8.
18	20	23	♀ in conj. with the ☽ diff. of dec. 5. 2. N.
20			Clock before the sun 3m. 14s.
—			☽ rises 3h. 30m. M.
—			☽ passes mer. 10h. 52m. M.
—			☽ sets 6h. 3m. A.
	10	6	♄ in oppo. to the ⊙
	12	30	☿ in conj. with ♂ diff. of dec. 6. 11. S.
	14	58	♀ in the ascending node
	22		☽ in Apogee
21	5	58	☿ greatest hel. lat. S.
	11	25	Ecliptic conj. or ● new moon
22	0	51	☿ in conj. with the ☽ diff. of dec. 0. 30. S.
	5	26	♂ in conj. with the ☽ diff. of dec. 5. 29. N.
23	5	52	Ceres in □ with the ⊙
	13	2	♃'s first sat. will im.
25			Clock before the ⊙ 1m. 59s.
—			☽ rises 8h. 45m. M.
—			☽ passes mer. 2h. 27m. A.
—			☽ sets 7h. 59m. A.
	9	35	☿ in inf. conj. with the ⊙
29	10	19	☽ in □ or first quarter
30			Clock before the ⊙ 0m. 35s.
—			☽ rises 2h. 9m. A.
—			☽ passes mer. 6h. 33m. A.
—			☽ sets 10h. 56m. A.
	14	55	♃'s first sat. will im.

J. LEWTHWAITE, Rotherhithe.

THE
LONDON JOURNAL,
AND
REPERTORY
OF
Arts, Sciences, and Manufactures.

CONJOINED SERIES.

No. CLXXVII.

RECENT PATENTS.

To Christopher Dunkin Hays, *of Bermondsey, in the county of Surrey, master mariner, for an invention of improvements in the construction and adaptation of apparatus for propelling and steering vessels on water.*—[Sealed 10th December, 1845.]

This invention of improvements in the construction and adaptation of apparatus for propelling and steering vessels on water, is applicable either to vessels in which steam or other power, applied to a propeller, is the principal agent for propelling vessels through the water, or to vessels in which propellers are merely used as an auxiliary power. The invention consists in so constructing and arranging stern-propellers, that the angle of the blades may be changed with facility; and, when required, the blades may be brought into a direct line with the keel of the vessel, so as not to interfere with the way or steering of the vessel when the propeller is not required to be used. A further improvement consists in so arranging the propelling apparatus that the blades may be removed and replaced, and the propeller unshipped with facility. The capability of bringing the blades into the line of the keel will be found to be of great service when the propeller is applied to sailing vessels, and employed as an auxiliary power only, as it may occasionally be found advisable and economical to dispense with the use of the propeller for a time; and if the blades are not then brought into a direct line with the keel, they will materially affect the steering and progress of the vessel, and impede its progress.

In Plate IV., fig. 1, represents a longitudinal vertical section of part of the stern of a vessel, with the improved propeller adapted thereto; and shewing also the apparatus whereby the angle of the blades of the propeller may be altered or regulated, and the blades brought into a line with the keel. Fig. 2, is a horizontal or plan view, the stern and rudder-posts being shewn in section; fig. 3, is a horizontal section, taken through the hollow shaft and boss, to which the propeller-blades are attached; and fig. 4, represents part of the stern of a vessel, with the propeller applied thereto. *a, a,* is the stern-post of a vessel; *b, b,* the rudder-post; and *c, c,* the hollow boss of the propeller-shaft *d, d,* which is also hollow at one end. The propeller-blades *e,e,* may be either straight or curved, as may be thought most desirable, and are provided with a pin or stud *f,* at their lower end; which pins are respectively inserted into a hole or socket made in the boss of the shaft to receive them. The pins of the propeller-blades may be either round or cylindrical, but a portion of their extreme end is made square, as seen in the detached view, fig. 5, for the purpose of fitting into a pair of sockets connected with the apparatus for altering the angle, as will be hereafter described. The boss *c, c,* of the propeller-shaft is of a hollow conical form, as shewn in figs. 1, and 2, and the pins or studs *f,* of the propeller-blades pass through circular holes made in the conical boss, so as to allow the said blades to turn on their centres when required; but at the same time the conical boss acts as a shoulder or support to the blades, and keeps them in their proper position, as will be clearly understood by referring to fig. 1. To the outer or larger end of the conical boss *c, c,* a cap-piece *g,* is bolted (figs. 1, 2, and 3,), which carries a short shaft *h,* forming a continuation of the propeller-shaft. This shaft *h,* is furnished with a moveable bearing or step *i,* which rests upon, and is supported by, a block *j*, secured to the rudder-post *b, b,* and fills up the lower half of the vacant space between the propeller-blades and the rudder-post. The inner or smaller end of the hollow conical boss *c, c,* is also furnished with a moveable plummer-block or bearing *i**, but of larger dimensions; and also rests upon, and is supported by, a stationary block *j**, which is attached to the stern-post *a, a,* and fills up the lower half of the vacant space between the propeller-blades and the stern-post. The hollow conical boss *c, c,* and the short shaft *h,* together with their respective moveable bearings or plummer-blocks *i,* and *i**, are held securely in their places by means of moveable blocks *k, k,* which are let down from above; and by resting upon the conical boss *c,* and the short shaft *h,* effectually prevent them from rising: these blocks *k, k,* when in their places, are secured by pins, or in any convenient manner, and fill up the upper half of the vacant spaces between the propeller-blades and the stern and rudder-posts *a,* and *b.*

The inner end of the conical boss *c, c,* is furnished with a clutch, which takes into a corresponding clutch, made at the outer end of the propeller-shaft, so that the propeller may easily be disconnected from the shaft and unshipped when required, as will hereafter be more fully explained. It will be remembered, that the pins or studs *f,* of the propeller-blades pass through holes made in the conical boss, but that the lower end of these pins or axles are made square, for the purpose of fitting into sockets. These sockets are shewn in the detached views, figs. 6, and 7, at *l, l,* and are inclosed in the hollow conical boss, as shewn in figs. 1, and 3.

The pin of one of the propeller-blades passes through one hole in the conical boss, and its square end is received in the square socket of one of the pieces *l*; and the pin or axle of the other blade passes through another hole made on the opposite side of the conical boss, and is received in the square socket of the other piece *l.* When the blades are to be placed in the proper position, the holes or sockets of the pieces *l, l,* must be brought into coincidence, as shewn in fig. 7; then, when the blades are placed in their proper sockets, the end of the pin or axle of one blade will abut against the end of the other; and in order to keep them steady, a pin or stud on the end of one of the axles, as shewn in the detached view, fig. 5, is made to enter a corresponding hole or socket made in the axle or stud of the other blade. The socket pieces *l*, *l*, are connected by means of links *m*, *m*, to a block *n*, which is moved backwards and forwards in grooves made in the conical boss *c*, by means of the rod *o*, which is screwed at one end, and passes through a female screw made in the block *n*, and carries, at or near its opposite end, a bevil pinion *p*, in the box *q*. This pinion *p*, gears into, and is driven by, a similar pinion *r*, the axle of which passes through the side of the box, as seen in figs. 2, and 3, and may be turned by a small winch or key. It will now be understood, that upon communicating motion by means of bevil-pinions *p*, and *r*, to the shaft *o*, (the inner end of which bears against the end of the box *q*,) the block *n*, will be made to advance or recede along the groove made in the conical boss, according to the direction in which the screwed shaft *o*, is turned; and as the block *n*, is connected to the socket pieces *l*, by the links *m*, the said sockets will be caused to move round, and turn the blades on their axes, and thus alter the angle at which they were originally placed. The detached view, fig. 7, represents the position which the block *n*, the link *m*, and the socket pieces *l*, *l*, will assume when the blades are brought to form nearly a right angle with the keel; and the sectional fig. 3, represents the position of the several parts when the blades are nearly in a line with the keel. Any angle between these two positions (as, for instance, that shewn in fig. 2,) is a propelling angle, and the inclination of the blades may be changed simply by turning the axle of the bevil-pinion *r*, as before mentioned. To enable the engineer to ascertain the particular angle at which the blades are acting, a graduated dial plate is placed on the top side of the box *q*, as seen in fig. 2, and an index-hand applied thereto, which is worked in the following manner:—The inner end of the shaft *o*, is furnished with a coarse threaded screw (seen best in fig. 3,) which gears into and drives a small horizontal wheel *s*, on the axle which carries the index. The dial plate is graduated according to the pitch of the screws at the ends of the shaft *o*, and the number of the teeth in the wheel *s*, so that the engineer may know, by inspection, how many revolutions to impart to the shaft *o*, in order to give a certain angle to the propeller blades. When the propeller is not in use it may be covered up, so as to be completely protected, and to present a more even, regular, and unbroken surface to the run of the water. For this purpose the blades of the propeller are brought into the line of the keel, and the propeller and all its appurtenances are enclosed between shutters. Fig. 8, represents the propeller, covered up by a shutter *t*, *t*, which is made of iron, and runs in iron grooves *u*, *u*, bolted or otherwise secured to the stern and rudder-post *a*, and *b*. These shutters are raised up and let down by means of ropes or chains, attached to the eyes or staples *v*, *v*.

Fig. 9, represents, in plan, the aperture that it is necessary to make through the deck, for the purpose of unshipping and bringing up the propeller and its appurtenances, and letting down the shutters *t*, *t*, when required. If it is required to unship the propeller, and bring it upon deck, the blades must be made to assume an acute angle with the keel, in order to admit of the filling pieces or blocks *k*, *k*, being removed; and when the blades are, by means of the shaft *o*, and its gearing, brought to the proper angle, the filling-pieces or blocks *k*, *k*, are raised, by turning the pinions *w*, which gear into racks made on, or attached to, the back of the blocks *k*, *k*. When these blocks have been removed from their grooves, it will be necessary to draw out the screwed shaft *o*, so as to allow the hollow boss to be disconnected from the clutch of the propeller-shaft. In order to do this, a short length of the propeller must be removed, as is generally the case in operations of this nature; then the end of the box *q*, is taken away, and the bevil-pinion *r*, and small horizontal wheel *s*, is removed, so as to allow the shaft *o*, to be unscrewed from the sliding-block *n*, of the conical boss. The propeller, with the conical boss *c*, and short shaft *h*, may then be raised up bodily, and brought on deck, through the opening shewn in fig. 9. To facilitate this operation, and obtain a secure hold of the propeller, which, it will be recollected, is some feet under water, the patentee has devised a simple instrument or apparatus, shewn at figs. 10, and 11. This instrument consists merely of a bar of iron *x*, curved to the form of the blades; the ends of the bar being bent up to embrace the edges of the propeller-blades. It is furnished with an eye or staple, through which a chain or rope is passed, and also with a socket *y*, to receive a handle or shaft, by means of which the instrument is managed. When the propeller is ready to be unshipped, the instrument is lowered down by slacking out the chain or rope, and the face of the bar *x*, is brought against the side of the blade, by means of the handle or shaft in the socket *y*; and then, by hauling up the rope or chain, the bent-up ends of the bar *x*, coming against the edges of the blade, as shewn in fig. 11, will securely hold it, and prevent it from slipping away; its own weight being sufficient to keep it from jumping out. The end of the shaft *h*, and the smaller end of the conical boss, being guided up the grooves in the stern and rudder-posts, it will only be necessary to haul away at the rope immediately that a secure hold is obtained by the bar *x*, and the propeller may be quickly brought on deck. When the propeller is required to be re-shipped, it is lowered down into its place by the same apparatus.

The patentee remarks, that he does not claim, as new, the several parts of the apparatus and arrangements for altering the angle of the blades, when taken separately, but that he claims, Firstly,—the construction and adaptation of a propeller, in which the angles of the blades may be varied, and the blades brought into a line with the keel, as above described; and, Secondly,—the construction and adaptation of a propeller, in which the blades may be removed and replaced as above described.—[*Inrolled in the Petty Bag Office, June,* 1846.]

Specification drawn by Messrs. Newton and Son.

To James Nasmyth, *of Arundel-street, in the county of Middlesex, Gent., for certain improvements in engines or machines for obtaining and applying motive power.*— [Sealed 29th April, 1845.]

These improvements in engines or machines for obtaining and applying motive power apply principally to atmospheric railways; although some parts of the invention are intended to be used, independently of railways, as motive power for other purposes.

In Plate VI., the improvements are shewn in connection with a pneumatic railway. Fig. 1, is a longitudinal section, taken vertically through a portion of a tube A, A, of any suitable diameter, in which a piston B, is intended to be worked by pneumatic pressure, for the purpose of producing the traction of carriages upon a railway constructed above it; C, C, is a long piston-rod, extending to a great distance, both behind and before the piston. The tube A, A, may be of any length, say a mile; in which case the rod C, C, should be of two miles extent. Near each extremity of the tube there is to be a standard or stretcher D, with an aperture and stuffing-box *a*, in the centre, for the passage of the piston-rod C; and beyond these stretchers, at each ultimate extremity of the tube, there are hung upon hinges a pair of doors E, which, when shut, are to close the end of the tube A, perfectly air-tight. These doors are seen in an end view of the tube, represented at fig. 2, and in the horizontal view of a portion of the end of the tube at fig. 3. It is intended when the doors E, E, are closed, to produce a vacuum or exhaustion of air in that part of the tube which is before the piston, by some convenient means, either by the condensation of steam therein, or by an air-pump, or other contrivances already known; or by the means which will be hereinafter explained as part of the improvements in obtaining motive power. When this vacuum is obtained in the tube before the piston, the doors E, E, behind the piston, must be thrown open, to give free access to the atmospheric air, by which the piston is to be impelled forward through the exhausted part of the tube.

In order to support the piston-rod C, C, as the piston moves onward through the tube, there are a series of guide-rollers, placed at suitable distances apart along the interior of the tube, one of which is shewn at F, in fig. 1. These guide-rollers are each mounted on an axle in the upper ends of pendulous tumbling levers G, which levers hang upon axles *b*, mounted in recesses H, formed in the under part of the tube; and at the lower end of each of these pendulous levers there is affixed, by an arm *c*, a plummet or bob *d*, which, by its gravity, keeps the tumbling lever erect, and the guide-roller F, under the piston-rod C; but when the piston B, has to pass any one of these guide-rollers F, an inclined plane *e*, placed in front of the piston (see fig. 1,), comes in contact with the roller F, and throws it and its tumbling lever down into the recess H, where the roller F, remains whilst the piston passes over it; and when the piston has passed, the pendulous tumbling lever is made again to resume its erect position by the gravity of the plummet or bob *d*, which brings the guide-roller under the piston-rod, as before, and thereby supports it.

The manner in which the pendulous levers are mounted in the tube will be best seen in the transverse vertical section of the tube, shewn at fig. 4, and the partial longitudinal representation of the outside of the tube at fig. 5. The tumbling lever G, as before said, moves within the tube upon an axle *b*, the pivots of which are inserted into the sides of the recess H; and to one end of the axle *b*, passed through the side of the recess, the bent arm *c*, is affixed, which carries the plummet. At the outer side of the projection, which is formed by the recess, a spring e^1, is attached, having a small notch in it, for the purpose of catching hold of a pin on the arm *c*, and thereby holding the pendulum or tumbling lever G, firm and erect. On the piston approaching the extremity of the tube, two horizontal rods *f*, extending from the front of the piston, strike against the doors E, E, and force them open; but before this takes place, that end of the tube before the advancing piston, which was in a state of exhaustion, must be permitted to receive a portion of atmospheric air, by the opening of a valve toward the end of the tube, which may be done by any convenient apparatus, acted upon by the advancing piston, or the piston-rod, or otherwise.

It has been said, that the tube A, A, may be a mile in length; the patentee proposes to place a series of these tubes along the line of a railway, at two miles distance from each other, and totally unconnected. To any precise lengths of tubes he does not however limit his invention, but observes, that for the carrying out of his invention, it is necessary that the spaces between the ends of any two tubes in the range, or longitudinal series, should be twice the length of the tubes themselves.

Supposing the length of the tube A, A, to be one mile, then the length of the piston-rod C, C, should be two miles, and the piston should be affixed to the rod, as at B, in the middle, that is, one mile from each outer extremity of the piston-rod. Fig. 6, represents one of the outer extremities of the piston-rod C, to which is attached an upright arm K. A similar arm is also to be attached to the reverse end of the piston-rod at the distance of two miles; and to the upper part of these arms K, K, the ends of a longitudinal rod L, of similar length to the piston-rod, is to be made fast. This rod L, is supported by a series of grooved rollers M, mounted on axles in carriages, fixed at suitable distances apart along the upper surface of the tube A, as shewn in figs. 1, and 4. It will hence be perceived that, as the piston B, passes along within the tube A, the piston-rod C, C, by means of connections to the ends of the paralled rod L, on the outside of the tube, will cause the rod L, to pass along over the rollers M, M, M, simultaneously with the progress of the piston; and that if a railway carriage or carriages be attached to the rod L, they will travel along the rail at the same speed that the piston passes through the exhausted tube. Having shewn the manner of supporting the piston-rod C, C, as it passes along the interior of the tube, and the rod L, L, as it travels along the outside of the tube, the patentee proceeds to describe the manner in which the extended length of the piston-rod C, is to be borne up, before and after it has passed through the tube. For this purpose a series of guide-rollers are mounted in suitable frames, at convenient distances apart, along the centre of the line of railway between the tubes, and coincident with them. The manner in which these guide-rollers and their appendages are constructed is shewn at fig. 7, which represents a transverse elevation, as they would appear standing across the railway. The piston-rod is shewn in transverse section at c; and N, is the guide-roller, on the upper surface of which the piston-rod runs. This roller is mounted upon an axle, turning in standards *g*, *g*; and above it there is another roller P, which, by pressing upon the piston-rod c, keeps it down in the groove of the roller N. The axle *h*, upon which the roller P, turns, is an arm or horizontal lever, mounted upon a vertical shaft *i*, *i*, supported by one of the standards *g*, and the bracket-frame *k*; the outer extremity of the arm or lever *h*, bears upon the standard *l*. As the piston B, progresses through the tube A, the upright arm K, (see fig. 6,) which connects the extremities of the horizontal rods C, and L, must be allowed to pass freely along the line of railway over the series of supporting-rollers N, fig. 7; it is therefore necessary that the rollers P, which press the piston-rod down upon the guide-rollers N, should be removed out of the way at such times as the arm K, is about to pass. This is done by the upright arm K, striking against the roller P, which causes it and its axle or lever *h*, to turn horizontally upon the vertical shaft *i*; and as soon as the upright arm K, has passed, a double spiral spring upon the shaft *i*, immediately brings the roller P, and its axle, into their former position, as shewn in fig. 7.

The long piston-rod C, and the parallel rod L, have been described as rigid rods or bars, which they may be, and perhaps would answer best if made tubular, like gas-pipes; but the patentee does not confine himself to the employment of such rods or tubes, as wire ropes or chains may be employed in place of rods. In such case, the wire rope or chain is formed into an endless band, and passed over two pulleys, situate at three miles apart; the vacuum tube A, A, occupying one mile in the middle of the line, between the two pulleys. The piston being attached to this endless band or chain within the tube, and the railway carriage to the endless band or chain outside the tube, as the piston moved in one direction, the carriage would be drawn in the opposite.

Having explained the manner of impelling carriages along railroads by means of their attachment to an upper rod or band, parallel to, and connected with, the piston working by atmospheric pressure in an exhausted tube,—the patentee observes that he does not confine himself to any particular lengths of tubes; but that whatever may be their length, a station or stopping place must be at the commencement and end of every tube, and also at the points reached by the ends of the horizontal rods C, and L. For instance,—let it be supposed that from the first station or starting place, the commencement of the tube A, shall be one mile distant,—the piston B, being brought to that end of the tube, the extremity of the piston-rod C, and the rod L, with their connecting arm K, will extend back one mile to the said first station. The railway carriage or carriages at the station being then attached to the nether end of the rod L, near the connecting arm K, and the piston B, put in motion, when the piston has reached the further extremity of the tube the carriage or carriages will have been drawn forward one mile; that is, to the second station, at the commencement of the tube. The carriages must then be released from their attachment to the rod L, and, by producing an exhaustion in the tube behind the piston, the rods with the piston will, by pneumatic pressure, be conducted back again, as in other atmospheric railways. This being done, the carriages are to be again connected to the rod L, but now near its middle, just over the situation of the piston; when, by the forward stroke of the piston, as before, the carriages will be impelled onward another mile to the third station, at the further extremity of the tube A. Here again the carriages are to be released from their attachment to the rod L, and the piston being sent back as before, the carriages are to be lastly attached to the further end of the rod L, at the extremity of the tube, when, by the next advance of the piston, the carriages will be sent forward on the railway another mile, that is, to the fourth station. The carriages have now arrived at that part of the line where the tube and the rods described cease to operate them. Another tube and its appendages, exactly similar in construction to those already described, then takes up the carriage or train of carriages, in the way before explained. Hence it will be perceived that the train is conducted forward from station to station, and that the tubes containing the working piston, instead of being continuous, as in other atmospheric railways, require to occupy only one-third of the length of the railway; being placed at intervals apart, the distance of which should be double that of the lengths of the respective tubes.

That part of the invention which refers to obtaining motive power is shewn in the drawing, in connection with a pneumatic railway.

At fig. 6, Q, represents a large wheel turning vertically upon a shaft *m*. On the periphery of this wheel the piston-rod C, bears as it passes; and, by the friction of contact between these two surfaces, the passing piston-rod will cause the wheel Q, to revolve. In order to promote the friction another wheel R, mounted upon a compound lever *n*, *n*, having its fulcrum at *p*, is brought down, and made to bear upon the upper surface of the piston-rod C; and a weight *q*, placed upon the arm *r*, of the compound lever causes the wheel to press with greater force and increase the friction. A pinion *s*, formed on the boss of the wheel Q, takes into the teeth of another wheel S, which last mentioned wheel may be employed, through a crank upon its axle, or any other contrivance, to work the air-pumps for exhausting the tube A; or as a motive power for any other purposes.

When the air-pumps are not required to be in action, the friction may be taken off by raising the wheel R, which is done by throwing back the arm *r*, and allowing it to rest against the stop *t*.

The patentee claims, Firstly,—the construction and working of atmospheric railways by the employment of a series of comparatively short disconnected vacuum tubes, placed at intervals apart, and operating independently of each other, in place of the long connected tubes heretofore used for the purpose of obtaining the traction of carriages by atmospheric pressure. Secondly,—connecting an external rod or rope with the travelling piston, for the purpose of attaching the carriages thereto, and obtaining traction from the centre of the working piston; which contrivance may also be applied to communicate motive power for other purposes. Thirdly,—applying the motive power, obtained by the friction of the piston-rod, or of the traction-rod or rope, against the peripheries of revolving surfaces, for working the air-pumps of pneumatic railways, and for any other purpose to which such motive power may be applicable. And, Lastly,—the introduction of apparatus for supporting the extended piston-rod within the tube, in order to preserve its horizontal position.—[*Inrolled in the Petty Bag Office, October,* 1845.]

Specification drawn by Messrs. Newton and Son.

To GEORGE HILL DUTTON, *of Dutton-street, in the county of Middlesex, brewer, for certain improvements in conveying intelligence from one part of a railway train to another.*—[Sealed 11th November, 1845.]

IT has long been a desideratum, that when an accident occurs to any part of a railway train, unknown to the engine-driver, immediate notice thereof should be given to him, in order that the progress of the train may be speedily arrested.

The object of this invention is to make signals, and communicate intelligence in such a manner, as at once to attract the attention of the engine-driver. It consists in the employment of an apparatus, whereby the passengers inside a carriage, or the guard on the outside, may be enabled to communicate any intelligence to the engine-driver.

The apparatus consists of a series of metal or other tubes, connected together, and extending the whole length of the train, and furnished at each end, and also at convenient and suitable places, throughout the whole length, with valves or covered apertures, through which either the passengers or guard may communicate intelligence to the engine-driver, or *vice versâ*. In addition to these apertures or valves, the continuous pipe is also furnished with whistles of great shrillness, or other loud signals, which should be sounded previous to any oral communication being made, in order to attract the notice of the driver. The patentee prefers to use thin brass or galvanized iron tubing, of about an inch or 1½ inch in diameter, but tubing of any other convenient size and suitable material may be employed. This tubing may also be placed either inside the carriage, along the roof, or under the flooring; which latter plan is, perhaps, more preferable, as it is more conveniently situated for connecting and disconnecting; but wherever it is situated, it will be necessary to have short pipes branching upwards or downwards, with mouth-pieces, so that communications may be made from any part of the train with facility, either to the guard or engine-driver. The main pipes, which extend along the top or bottom of the carriages, as aforesaid, are, of course, rigid and straight, and are furnished at their ends with sockets, into which the ends of flexible connecting pipes are inserted, for the purpose of connecting the pipe of one carriage to the pipe of the adjoining carriage. These connecting pipes are made flexible in order that they may yield to the action of the buffer-springs, and allow for the varying distances between the carriages as they approach and recede from each other. As it is important that the connection of the flexible connecting pipes between the carriages to the rigid pipes in the carriages, should not only be secure, but simple and easy of application and disconnection, and not liable to derangement, a spring-catch is applied to each end of the flexible connecting pipe, which, by taking into a hasp or box, made on or attached to the end of the rigid carriage tubes, will securely hold the two in connection.

In Plate V., fig. 1, represents a side elevation of part of a tube, with the speaking and whistling apparatus attached thereto; fig. 2, is a plan view; and fig. 3, is an end view of the same. *a, a,* is part of the rigid metal tube, which, in order to prevent a loss of sound, should be covered over with leather, or any other material which is a bad conductor of sound. *b, b,* is the mouth-piece, made spherical in order to enclose a proper quantity of air, which will be required to enable the sound of the whistle to be conveyed along the tubes; *c*, is the whistle at the end of the tube; and *d*, is the valve which closes the mouth-piece, as will be necessary when sounding the whistle. The sound from the whistle enters directly into the spherical chamber *b*, *b*, and acts against the volume of air contained therein; and as the valve, or door *d*, is made to close accurately and prevent the sound from escaping, the sound is made to proceed along the tube. The face of the valve *d*, is ground, and accurately fitted to its seat; and it is closed by means of a spring-catch *e*, which is easily drawn back and released when it is required to speak through the tube. In order to prevent the vibration or noise in the carriages from interfering with the sound, the tube is carefully prevented from coming into contact with either the metal or wood-work of the carriages; and the holes made in the ends and partitions of the carriages, for the purpose of allowing the said tube to pass through, are lined with leather or some other suitable material. *f*, *f*, figs. 1, and 2, represent portions of the flexible tube with the spring-catch *g*, and conical metal end-piece *h*, which is inserted into the socket *i*, at the end of the rigid tube *a*, *a*, of the carriage. The spring-catch *g*, is fastened on to the metal end-piece of the flexible tube, as shewn in figs. 1, and 2; and when the two tubes are brought together, the spring-catch enters the hasp or eye-piece *j*, on the end of the tube *a*, *a*, and securely holds the two tubes in connection.

It should be observed that both ends of the flexible connecting tube are furnished with spring-catches *g*, and conical end-pieces *h*; and the ends of the tube *a*, *a*, are also furnished with corresponding sockets *i*, and hasps or eye-pieces *j*, which, being all made of the same size and placed in the same relative situations in all the carriages, may easily be connected or disconnected when required. And, further, that a mouth-piece and signal, such as that above described, and placed at the end of a branch-pipe, should be placed in any convenient situation inside every carriage of the train; or, if required, in every separate compartment of the carriage, so that the passengers may be enabled to communicate direct with the engine-driver or the guard. Fig. 4, represents portions of the two tubes in connection.

The patentee claims communicating intelligence from one part of a railway train to another; that is to say, from the guard or passengers to the engine-driver, and *vice versâ*, by means of tubes placed in the carriages, and connected together by means of flexible tubes, situated between the carriages, so as to form one continuous tube throughout the whole train; and which tube is furnished with signals and mouth-pieces at suitable places throughout its whole length, for the purpose of enabling either the guard or passengers first to arrest the attention of the engine-driver, and then to communicate any intelligence to him.—[*Inrolled in the Petty Bag Office, May,* 1846.]

Specification drawn by Messrs. Newton and Son.

To HENRI AUGUSTE BEX, *of* 3, *Great Titchfield-street, in the parish of Saint Marylebone, in the county of Middlesex, architectural decorator, for a new method of polishing, dyeing, and coloring marble, stone, and certain other materials used in the construction or decoration of houses and other buildings.*—[Sealed 10th December, 1845.]

THIS invention consists, firstly, in polishing marble and stone by filling up the pores with plaster of Paris or marble cement; then rubbing them with certain hard stones (a thin layer of plaster being applied before each rubbing); and, lastly, rubbing them with wax or a mixture of wax and turpentine. Secondly, in polishing certain other materials used in the construction or decoration of houses and other buildings, by rubbing them with a varnish of gum lac. And, thirdly, in dyeing and coloring marble, stone, and certain other materials, by wetting them with certain acids, salts, and coloring materials, or certain chemical combinations of such acids, salts, or coloring materials, by means of a brush or sponge.

To polish marble or stone, the surface is first rubbed with a piece of sandstone, and afterwards with sandstone of a finer description; the pores of the marble or stone are then stopped with plaster of Paris, mixed with a thin solution of gelatine and some coloring material, to bring it to the consistence of cream; and to give it the same color as the marble or stone; or the pores may be filled with marble cement mixed with water and some coloring material, to give it the same consistence and color: the mixture is laid on with a brush, and afterwards scraped off with a wooden knife; care being taken that all the pores of the marble or stone are filled. After this, the marble or stone is rubbed with a kind of sandstone, called "Charley Forest stone;" then the pores are stopped again, if necessary, and the marble or stone is again rubbed with Charley Forest stone; it is afterwards rubbed with a stone called German hone, and finally with a piece of touchstone: before each rubbing, a thin coat of plaster of Paris or marble cement, brought to the consistence of milk by the addition of water, is laid on with a brush. Lastly, if the color of the marble or stone be clear, a coat of wax, or a mixture of wax and turpentine is laid on, and rubbed with a linen, cotton, or woollen rag, until the marble or stone becomes perfectly polished; but if the color should not be clear, the marble or stone is rubbed with linseed oil, until the color becomes clear; care being taken to remove all the oil before the wax or mixture of wax and turpentine is applied. In addition to the above operations, the patentee rubs the marble or stone with a piece of jasper, when a very brilliant polish is required.

To polish the "certain other materials," used in the construction or decoration of houses and other buildings, the patentee proceeds in the manner above described, until he has completed the rubbing with Charley Forest stone; he then rubs them with linseed oil (taking care to wipe it off thoroughly), and afterwards applies a varnish of gum lac, by wetting the surface of a ball of wool with the varnish, and covering it with a linen rag, and then rubbing the materials to be polished in the same manner as when polishing household furniture: a little oil is added occasionally, if the varnish does not work freely.

To dye and color marble, stone, and certain other materials used in the construction or decoration of houses and other buildings, the patentee employs the same system of acids and salts or coloring materials; and the chemical combinations of the said acids, salts, or coloring materials, as is generally used by dyers for dyeing cloth and other textile fabrics; and he applies these materials in a liquid state, by means of a brush or sponge. If the dyed or colored surface is required to have the same polish as the rest of the marble or other material, the coloring matters are applied before it is polished, or when the polishing process is only half completed; but if the dyed or colored part is to be left dead or unpolished, the coloring matters are applied after the polishing is finished.

The "certain other materials," used in the construction of houses and other buildings above alluded to, are plaster, stucco, scagliola, and a species of stucco, called *stuc à la brosse*, invented in France, and introduced by the patentee into England.

The patentee claims, as his invention, First,—the filling up with plaster of Paris or marble cement, in the manner above described, the pores of marble and stone intended to be polished, and rubbing them with certain hard stones, as above described. Secondly,—the polishing of the certain other materials used in the construction or decoration of houses and other buildings, by rubbing them with a varnish of gum lac, in the manner before mentioned. The patentee does not claim the sytem of varnishing, above described, as his invention, but only the application of it to the polishing of the said material. Thirdly,—the dyeing and coloring of marble, stone, and the other materials above mentioned, by wetting them with certain acids and salts, or coloring materials, or certain chemical combinations of the said acids and salts or coloring materials, above mentioned, by means of a brush or sponge.—[*Inrolled in the Rolls Chapel Office, June,* 1846.]

To Peter Higson, *of Clifton, in the county of Lancaster, mining engineer, for his invention of certain improvements in machinery or apparatus for connecting and disconnecting the steam-engine, or other motive power, with or from the load or matter to be driven or moved.*—[Sealed 9th August, 1845.]

These improvements apply to the coupling or connecting of steam-engines, water-wheels, and other primary driving power, with shafts and machinery, and disconnecting the same, and also in so applying the power again to the load or other matter to be driven or moved, that the rotary motion may be reversed as required. By this improved arrangement and construction of connecting, coupling, or reversing machinery or apparatus, the continuous rotation of the motive power is allowed to proceed without interruption, and the shaft which is in immediate connection with the load or other matter to be driven, is readily and instantly reversed, as occasion may require. The invention is stated to be particularly applicable to mining purposes, such, for instance, as winding up coals or other matters from shafts or pits; holding or retaining the vessels or buckets whilst they are emptied, and again lowering the vessels; and especially in such situations where the water-wheel constitutes the primary moving power, as its continuous action is thus allowed to proceed without in any manner interfering with the load when it is not required. In reversing a steam-engine a considerable quantity of steam is unavoidably wasted; consequently there will be a corresponding waste of fuel, which may be obviated by using the improved reversing machine; also, when an engine has been reversed, some time will elapse before it can attain its maximum velocity,—during which period its effective power is diminished; whereas, the load may be reversed by the reversing machine, in half the time it can be reversed by the steam-engine or other motive power. The reversing machine is particularly adapted to water-wheels, employed in drawing coal up a perpendicular shaft or inclined plane at collieries; also when employed in working wash-wheels, calendering machines, hydraulic presses, &c.; or raising or lowering materials for the construction of works; or in any case where it is requisite to relieve the moving power of the load, or to reverse its direction. It will be found generally useful on public or private railways, to connect with any moving power which may be applied for drawing or raising waggons or any load up an inclined plane or shaft, or for lowering the same; and its great utility will be found at railway stations, for raising or lowering waggons or weights to or from the level of the rails to that of the street or road; and also for hoists used at factories. It may be connected with the moving power in various ways, and by means of spur-wheels as well as bevil-wheels.

In Plate VII., fig. 1, represents a plan or top view of the apparatus, as seen from above, and is supposed to be placed between the water-wheel (as a driver) and the winding-shaft and drums of a coal-pit,—the buckets or vessels of which, ascending and descending, require a reciprocating or reversed motion, whilst that of the water-wheel is continuous in one direction. Fig 2, is a sectional elevation, taken through the line A, B, in fig. 1; and fig. 3, is a ground plan or diagram, on a smaller scale, shewing its relative situation as applied to the water-wheel or driving power, and the pit or shaft of a mine, and which will better illustrate the application of the invention. *a, a,* is the main driving-shaft of the apparatus, mounted in the bearings or standards *b, b,* and connected to the water-wheel or other primary moving power by the bevil-wheel *c.* Upon the driving-shaft *a,* are placed loosely two bevil-wheels *d,* and *e,* which are furnished with hollow friction-drums or cones *f,* and *g,* whose inner surfaces are acted upon by a pair of friction-cones *h,* and *i,* alternately, in the manner and for the purposes hereinafter more particularly described. The pair of friction-cones *h,* and *i,* are connected to the main driving-shaft *a,* by a feather and key (shewn by dotted lines at *j,* in fig. 2), in such a manner as to revolve with it, but still to allow of their being moved upon the shaft in a longitudinal direction. Thus it will be seen, that if the position of these cones *h,* and *i,* is shifted, so as to bring the exterior surface of the cone *h,* into close contact with the interior surface of the friction-cone *f,* the wheel *d,* will become thereby connected with the driving-shaft *a,* and be caused to revolve with it; whilst the other wheel *e,* is disconnected, and allowed to revolve freely and loosely upon the shaft. Into both of these wheels *d,* and *e,* the bevil-wheel *k,* gears, and, consequently, supposing the main driving-shaft *a,* to be revolving in the direction of the arrow, and the cone *h,* to be in contact with the cone *f,* then the shaft *l,* upon which the wheel *k,* is fixed, will revolve in the direction of its arrow; but as soon as the friction-cone *i,* is brought into contact with the friction-cone *g*, upon the wheel *e*, the motion of the shaft *l*, will be reversed. This shifting of the position of the friction-cones *h*, and *i*, is effected in the following manner:— It will be seen, by reference to the sectional figure 2, that one end of the main driving-shaft *a*, is made hollow or tubular, so as to allow of the shaft *m*, sliding in it. At one end of the shaft *m*, is a slot or mortice *n*, through which a cotter or key *o*, passes; this key *o*, passes also through the boss of the cones *h*, and *i*, and connects them to the shaft *m*. At the other end of the shaft *m*, is fixed a saddle-piece *o**, which is supported by, and slides upon, the horizontal rods *p, p, p*. To the saddle-piece *o**, a nut or socket *q*, is attached, in which a screw *r*, works. This screw is mounted in a suitable bearing *s*, and is for the purpose of bringing the one or the other of the friction-cones *h*, and *i*, into close contact with the cone *f*, or *g*, by turning the spoke or hand-wheel *t*, (fixed at its other extremity), either in one direction or the other. There is a crank-pin or stud *u*, upon the spoke-wheel *t*, which is connected by a series of levers *v, v, v*, to the brake *w*, upon the shaft *l*. The position of this crank-pin is so arranged that when the cones *h*, and *i*, are not in contact with either of the cones *f*, and *g*, the pin *u*, is at its lowest point, and consequently the brake is tightened upon the shaft *l*, and its further motion is stopped; in which situation it may be allowed to remain as long as required. Upon turning the spoke-wheel *t*, further in the same direction, the brake is released, and the motion of the shaft *l*, is reversed. *w**, *w**, are screws, for the purpose of adjusting the distance between the cones *h*, and *i*. In fig. 3, A, is the centre line of the water-wheel, which, by means of the bevil-gearing B, drives the shaft *a*, corresponding to that marked *a*, in figs. 1, and 2. C, is the mouth of the coal-pit; and D, is a frame, for supporting the winding pulleys.

The patentee, in conclusion, states that, for the sake of illustration, he has described his invention as applied to the purpose of winding coal merely; but he claims the above-described arrangement of machinery or apparatus in all situations where it may be applied for the purposes of connecting and disconnecting the steam-engine or other motive power with or from the load, or other matter to be driven or moved, or retaining the load in a state of rest, as may be required.—[*Inrolled in the Petty Bag Office, February,* 1846.]

To WILLIAM COLE, *of Coventry, in the county of Warwick, warehouseman, for certain improvements in looms.*—[Sealed 23rd December, 1845.]

THIS invention consists, firstly, in the application of more than two sets of shuttles in one loom for the weaving of ribbons, and in arranging or disposing and actuating such shuttles, and the batten containing them, in the manner hereafter described. Secondly, in another arrangement of drivers or peckers employed for actuating the shuttles; such arrangement being more particularly calculated for the manufacture of that class of goods known as checks and tartans, which require one color or shuttle, or row of shuttles, to be worked several times in succession, before bringing into operation the next row of shuttles, containing weft of a different color.

In Plate V., fig. 1, exhibits a front elevation of the sliding batten hereafter described; the work rollers represented at fig. 1*, being removed from the front thereof. Fig. 2, is a partial front elevation of the batten containing the reeds, shewing also the sliding batten in two parts; each part being represented at a different height, for the purpose hereafter mentioned. Fig. 3, is a transverse vertical section taken through the line *a, b,* of figs. 1, and 4, the latter of which figures is a back elevation of the sliding batten, exhibiting the arrangement of parts for actuating the shuttles. Fig. 5, is a front elevation of the sliding batten, without the shuttles. Fig. 6, is a transverse vertical section thereof, taken through the line *c, d,* of fig. 5. A, is a portion of the framing of the loom, from the upper part of which two pins C, C, project, and carry the levers B, B; to one end of each lever a rod or chain D, is attached, and the lower ends of these rods or chains are furnished with hooks E, E, from which the sliding batten F, F, is suspended; this batten is guided in its proper course by guide-bars G, G, fixed to the batten H, containing the reeds, and which batten is attached to the loom in the usual manner. I, I, I, I, are four rows of shuttles, working in races and grooves K, K, formed in the batten F; the shuttles being retained in the races and grooves by their shoulders 1, 2, fig. 6. L, M, N, O, are drivers or peckers, for actuating the shuttles. P, P, are openings in the sliding batten F, opposite the reeds in the batten H, through which the warp passes, in the usual manner. Q, R, are sliding bolts or blocks of wood, for determining the height to which the batten F, is raised; these bolts or blocks are connected to the Jacquard machine by the cords 3, 4,—and to the other ends of the blocks check-springs 5, 6, are attached, for returning them to their original position, after they have been acted upon by the Jacquard machine. S, T, U, V, are sliding bolts or rods, working in grooves in the batten F. To these bolts or rods, and in a vertical line with one end of each shuttle in the several rows, the drivers or peckers L, M, N, O, are fixed, and the bolts or rods are provided with handles 7, 8, 9, 10, by which the shuttles of one or other of the rows may be simultaneously acted on by the attendant; or, in some instances, the movements of the bolts may be effected by mechanical means. There are slots 11, 12, formed in the front of the sliding batten, for connecting the handles 9, and 10, to the bolts S, and U; and the handle 10, is guided in its proper course by antifriction rollers 13, 14, 15, and by the piece W, having a slot formed therein, through which the said handle works. X, (figs. 1, and 3,) is a lever, one end of which is mounted upon a pin Y, attached to the framing of the loom, and the other end rests upon a cord or chain Z, fastened to the levers B, B; and from this end of the lever is suspended a weight Z^1, which is somewhat heavier than the sliding batten and its appurtenances.

The following are the operations of this apparatus:—Motion being imparted to one or other of the handles 7, 8, 9, 10, in the direction of the arrow, fig. 1, it will have the effect of throwing the shuttles along the grooves and races K, and the shuttles will be arrested by coming in contact with the opposite sides of the drivers to those which impelled the shuttles;

To ROBERT JAMES HENDRIE, jun., *of Blossom-street, Norton Falgate, in the county of Middlesex, dyer, for an improvement in the preparation of silk.*—[Sealed 11th November, 1845.]

THIS invention consists in a novel mode of treating or preparing hanks or skeins of silk, so as to improve the appearance of the silk, by producing upon the surface of its fibres a beautiful lustre.

The manner of effecting this improvement is, by submitting the silk in the hank or skein, when damp, to the action of currents of air, whilst the fibres of the silk are held in tension. There may be various contrivances employed for carrying out this object; one of these is explained with reference to the figures in Plate IV., where an apparatus, which has been found to answer the purpose, is exhibited. Fig. 1, represents, in elevation, a peculiar form of machine or rack, upon which the hanks of silk are hung and stretched in a damp state, so as to be acted on by heated air, or air of the ordinary temperature; and fig. 2, is a vertical section, taken through the middle of the machine, shewing its internal parts, and the means of working it.

A broad horizontal platform *a, a, a,* constitutes the base of the machine; it is made of plates of iron, connected together round their outer edges, and forms a hollow chamber, intended to be used as a hot air, hot water, or steam chest. Upon this base the perpendicular hollow shaft *b, b,* is firmly fixed by a flange, with bracket-arms securely bolted to the platform. To the shaft *b,* a series of arms *c, c, c,* are permanently fixed, extending radially in a horizontal plane. On the upper part of the shaft *b,* a socket *d, d,* is fitted, which is capable of sliding up and down in a vertical direction, but prevented from turning round by a key or pin let into a groove *e,* cut perpendicularly in the shaft. From the lower part of the sliding-socket *d,* a series of radial arms *f, f, f,* extend in a horizontal plane, parallel to, and corresponding in number and position with, the radial arms *c, c, c.* The socket *d,* with its arms *f, f, f,* are made to ascend or descend upon the shaft *b,* by means of a vertical screw *g,* working in a screw-box *h, h,* fixed in the upper part of the hollow shaft;

which screw *g*, is turned by a capstan or lever *i*, *i*, attached to its top.

The mode of using the machine is as follows:—Any convenient number of hanks or skeins of silk are extended over the several pairs of parallel arms *c*, *f*, as represented at *k*, *k*, *k*, in fig. 2; and by means of the capstan or levers *i*, *i*, the screw *g*, is turned, for the purpose of raising the socket *d*, with its arms *f*, *f*, *f*; which rising of the arms *f*, *f*, *f*, will distend the skeins or hanks of silk, and hold them in tension. Into the hollow base or chamber *a*, hot air, hot water, or steam is introduced, by means of the pipe and cock *l*; and, if necessary, a continuous current is passed through the chamber *a*, by opening the discharge-cock and pipe *m*. The chamber *a*, being heated, a warm atmosphere will be produced about the lower parts of the machine, and the temperature of the air being thus raised, it will gradually ascend between the radial arms, and, in passing through the hanks or skeins, will act upon the silk in its distended state, so as to dry it.

It must be obvious that skeins or hanks of silk may be distended by various contrivances; the patentee does not, therefore, intend to confine himself solely to the use of the machine above described; but he claims, Firstly,—preparing silk by submitting it, in tightly-distended skeins or hanks, when damp, to the action of heated air, or air of the ordinary temperature, in which it must remain until dry, for the purpose of producing upon its surface a lustre or gloss; and, Secondly,—the machine, above described, for effecting that object.—[*Inrolled in the Petty Bag Office, May,* 1846.]

Specification drawn by Messrs. Newton and Son.

To THOMAS MOORCROFT BENBOW, *of Birmingham, surgeon, for improvements in fastenings for surgical and other bandages, and for articles of dress,—being partly a communication.*—[Sealed 13th January, 1846.]

THIS invention consists, firstly, in an improved arrangement of parts for fastening surgical and other bandages, by means of which those bandages may be more readily applied and removed than by the arrangements heretofore in use for that purpose.

In Plate V., fig. 1, shews the ends of a bandage, connected by the improved fastening; and fig. 2, is a detached view of part of the fastening, to exhibit its construction more clearly. *a, a,* are pulleys or rollers, mounted in clasps *b, b,* secured to the pieces of metal, whalebone, or other material *c, c;* these pieces *c, c,* have suitable recesses formed in them to receive the pulleys *a, a,* and are enclosed in the web or fabric that constitutes the bandage. *d,* is a cord which connects the two parts of the apparatus together, and is formed into an endless cord by tying its ends; beginning at the lower edge of the bandage, it passes round the two bottom pulleys, and then passes round a pulley on each side alternately, until it arrives at the middle of the bandage, where it is carried through the two eyelet-holes on each side, in the manner shewn, and then proceeds across from one side to the other up to the top pulleys, where the ends of the cord are united. The ends of the bandage are drawn closely together by pulling the parts d^1, d^1, of the cord *d;* and it is kept at any desired degree of tightness by tying those parts together. If the upper or lower part should be required to be looser, and, consequently, more open than the other part, this may be regulated by drawing the parts d^1, d^1, accordingly. This improved mode of fastening may be applied to stays; and, with regard to such applications, the patentee says, he is aware that pulleys or rollers have been applied to stays, but they have been either so attached, as to project and prevent the stays from closing, or so that their form might be seen, and, consequently, an increased wear was caused in the garment over the pulleys; but in the above arrangement the pulleys do not project, or project but slightly, beyond the edge of the whalebone or other material, so that the edges of the stays or bandage may come close together.

The second part of this invention consists in improvements in hooks for fastening articles of apparel. Figs. 3, represent a plan and edge view of a hook; the improvement consists in forming it with the projecting parts *a, a,* by which it is securely and closely sewn to the garment, in addition to the ordinary mode of attachment at *b, b.* Figs. 4, shew two hooks, formed so as to be easily detached from the eye by pulling a ring, tassel, or other ornament, attached to the loop or bend *c,* at the back of the hook.

The third part of the invention relates to the form of eyes to be used with hooks for fastening garments. The patentee says that, in using the ordinary eyes, it has been found that when any sudden strain has happened they have collapsed, rendering it difficult to remove the hook therefrom. To remedy this, the eye is formed in the manner shewn at fig. 5; the parts *d, d,* by which the eye is connected to the garment, are brought close together, and the part *e,* over which the hook passes, is shortened. The eye is preferred to be partly enclosed in the garment, as exhibited at fig. 6.

The fourth part of this invention relates to the wire and other springs used in caps and other articles of head-dress, to retain them on the head; it consists in preventing them from being corroded by moisture from the head or otherwise, by covering them with cotton, silk, caoutchouc, or other suitable material, applied as a thread or otherwise, and by cement, if necessary.—[*Inrolled in the Inrolment Office, July,* 1846.]

To JOHN DAVIS, *of Brettell-lane, in the county of Stafford, glass manufacturer, for a certain improvement or certain improvements in or applicable to lamps.*—[Sealed 3rd June, 1845.]

THE first part of this invention consists in forming reflecting surfaces upon the shades or chimneys of lamps, by enamelling, painting, or silvering, in order to concentrate and reflect the light in any required direction.

In Plate IV., fig. 1, represents a shade for a table lamp. *a,* is the upper part of the shade, which is covered with enamel, while the lower part *b,* consists of plain and colorless or colored glass; the part *a,* of the shade forms an annular reflector, situated very nearly over the flame of the lamp, and from its opacity and the brilliancy of its surface it will reflect downwards the greater portion of the light radiated from the flame, and illuminate the table or surface on which the lamp stands. Fig. 2, represents a shade for a candle-lamp; and fig. 3, is a shade or "moon" for a gas burner: *a*, in each figure being the enamelled surface, and *b*, the plain transparent part of the shade. If the enamel be sufficiently thick it will intercept the whole of the light falling upon it, and nearly the whole of the light will be reflected; and by varying the thickness or opacity of the enamel any desired proportion of the light falling thereon may be reflected downwards or transmitted upwards through the enamel. The enamel may be either applied to the outer or inner surface of the shade, or introduced between two layers of glass. Sometimes, instead of enamelling the upper part of the shade, the patentee applies the enamel to the lower part, below the flame, so as to reflect the light upwards; and, in some cases, the reflecting surface is situated at the side of the shade, so as to reflect the light horizontally. Instead of using enamel, the reflecting surfaces may be produced by coating the exterior of the shade with paint, or by silvering the same.

The second part of this invention consists in the peculiar mode of forming chimneys for lamps, exhibited at fig. 4; c, c^1, being the chimney, and the dotted lines d, representing the shade by which the chimney is partly surrounded. In the ordinary mode of forming chimneys and shades, the parts c^1, and d, are made in one piece, and the chimney c, (which, according to its form, ensures a more or less perfect combustion of the material used for producing light) is detached from the shade, and situated in the centre thereof. The present improvement consists in constructing a chimney in such a manner, that when used with a shade of a spherical or other suitable form, the upper part c^1, of the chimney has the appearance of the upper part of a shade (see *a*, fig. 1). The parts c^1, and d, being separate, can be more readily ornamented than when made in one pieee, and reflecting surfaces can be more easily formed thereon, according to the first improvement.

The patentee claims, Firstly,—the introduction of reflecting surfaces of opaque or semi-opaque enamel into the shades or chimneys of lamps, whatever the nature of the combustible substance used for producing flame in the said lamps, and whether the said reflecting surfaces are uncoated, or coated on one or both sides with colored or colorless glass; also the production of the said reflecting surfaces by painting or silvering portions of the said shades or chimneys, as above described and represented at figs. 1, 2, and 3. Secondly,—the method of constructing chimneys for lamps, above described and represented at fig. 4.—[*Inrolled in the Inrolment Office, December*, 1845.]

To THOMAS LEVER RUSHTON, *of Bolton-le-moors, in the county of Lancaster, iron manufacturer, for certain improvements in the manufacture of iron.*—[Sealed 21st June, 1844.]

THIS invention relates to the manufacture of malleable iron in reverberatory furnaces.

The first improvement consists in mixing hammer slack, roll scale, red ore, calcined ironstone, or other oxide, in a pulverized state, with a proportion of finely pulverized charcoal, coke, or other suitable carbonaceous matter (which should be as free as possible from sulphur), and introducing the mixture into the furnace before, or along with, or immediately after the charge of pig or refined iron. The mixture of ore and carbonaceous matter is turned over from time to time, until the iron is melted, and then they are worked together in the usual way. The patentee says, that this process is very similar to that described in the specification of a patent, which was granted to W. N. Clay, March 31, 1840;* but, in the present instance, the proportion of carbonaceous matters varies from 17 up to (but not including) 28 per cent. by weight of the ore or oxide; whilst Clay's invention was confined to the use of not less than 28 per cent. The proportionate weights of carbonaceous matter and ore or oxide employed, within the above limits, depend upon the quantity of carbon and oxygen they respectively contain, the description of pig-iron used with them, and the amount of pig-iron to be added to the mixture. The following proportions produce an abundant yield of excellent iron:—480 lbs. of No. 4, pig-iron, 84 lbs. of Lancashire hematite ore, and 20 lbs. of coke-dust: if No. 1, pig-iron be used, a smaller quantity of carbonaceous matter will be required; but if the charge of No. 4, pig-iron be reduced to 420 lbs., the weight of ore or oxide should be increased to 180 lbs., and the coke to 48 lbs.

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* For description of this invention see Vol. XXI, of our present Series, p. 369.

The second improvement consists in the addition of clay, argillaceous ironstone, or other substance containing alumina, to the ores or oxides which produce iron of the quality termed red-short. The clay, or other substance used, should be ground fine and dried, before being mixed with the ore. A larger quantity of carbonaceous matter (generally above 28 per cent.) will be required for a given quantity of ore, than if no clay were used; for the clay, in addition to its capability of taking up the carbon, has a tendency to diminish the contact of the ore or oxide with the carbonaceous matter, and thereby prevent a complete decomposition. The proportion of clay will vary with the quality of the ore, but from 4 to 10 per cent. of the weight of the ore will be sufficient when operating on the Lancashire hematite ores. If too much clay be used, the tap cinder will be very sluggish, and the ball, when under the hammer, will emit continuous showers of dark red cinders; and if too little be employed, the iron will retain some of its red-short quality.

The third improvement consists in combining a portion of the tap or flue cinder of puddling and balling furnaces with a portion of clay, chalk, carbonaceous matter, and rich iron ore, or some of these substances, and manufacturing the mixture (either with or without pig or refined iron), in reverberatory furnaces, into malleable iron. The materials must be pulverized and dried before being mixed together. The relative proportions of the different substances may be as follows:—150 lbs. of tap cinder, containing about 71 per cent. of protoxide of iron, 150 lbs. of Lancashire hematite ore, 20 lbs. of pulverized Worsley fire-clay, 20 lbs. of chalk, and 100 lbs. of coke-dust.

With regard to the first part of this invention, the patentee says he does not claim to have discovered the manufacture of malleable iron in reverberatory furnaces, either with or without a portion of pig, or scrap, or refined iron, nor the advantage of pulverizing the ores and carbonaceous matter; but he claims the manufacture, in reverberatory furnaces, in the manner above described, of malleable iron, by means of ores and carbonaceous matter, mixed in proportions limited as before mentioned, and combined with a portion of pig or refined iron. Under the second improvement, he does not claim to have discovered the advantage of using a portion of clay or argillaceous ironstone in the manufacture of iron from certain ores, that having been previously done in the manufacture of pig-iron from such ores; but he claims the use of clay as an ingredient to be employed in a pulverized state, mixed with certain ores and carbonaceous matter, also pulverized, for the manufacture, both with and without pig or refined iron, of malleable iron in reverberatory furnaces. With regard to the third improvement, he does not claim to have first applied a portion of tap or flue cinder or other silicate of oxide of iron with lime or carbonate of lime, and with iron ore, clay, and carbonaceous matter, all these having long been used in the manufacture of pig-iron; but he claims the manufacture of malleable iron from the combination of those substances, pulverized (both with and without pig or refined iron), in reverberatory furnaces, as before described.—[*Inrolled in the Inrolment Office, December,* 1844.]

To EDWARD HALL, *of Dartford, in the county of Kent, civil engineer, for an improved double-cylinder condensing engine.*—[Sealed 15th November, 1845.]

THIS invention consists in the application of an expansion slide-valve to the back of one of the ordinary slide-valves of a double-cylinder condensing steam-engine, to regulate the supply of steam to the cylinders, by admitting it during such part only of the stroke of the small piston as may be necessary to expand it to the extent desired. The capacity of the two cylinders has hitherto been generally in the ratio of one to four; but, by this arrangement of the expansion slide-valve, the steam may be expanded to four, six, or a greater number of times its original volume, previous to being condensed.

In Plate V., fig. 1, is a plan view of the combined cylinders of the engine, with their valve-boxes; and fig. 2, is a vertical section, taken in the line 1, 2, of fig. 1, the rods by which the valves are worked being removed. *a*, is the large cylinder; *b*, its valve-box; *c*, the small cylinder; *d*, the valve-box belonging thereto; *e*, the slide-valve; *f*, the expansion-valve at the back of the same;—these valves are shewn in the position they would be when the steam is cut off from the under side of the piston *g*, of the small cylinder. The steam from the boiler is conducted through the cylinder-casing *h*, and pipe *i*, to the valve-box *d*, and is admitted by the slide-valve *e*, alternately to the top of the piston *g*, by the passage *j**, and to the bottom of the piston by the passage *k**; on its exit from the cylinder *c*, the steam is conducted by the valve *e*, into the pipe *l*, through which it passes to the cylinder *a*, and after acting on the piston therein escapes through the eduction-pipe into the condenser. The expansion-valve *f*, receives motion by means of rods connected with the cross-head *m*, from a tumbler of only half the throw of the tumbler that works the valve *e*, and is adjusted in such a manner as alternately to close the two apertures *j*, *k*, of the valve *e*, when the piston *g*, has travelled through such part of its stroke as may have been determined upon; so that the admission of the dense steam from the boiler into the small cylinder being interrupted by the expansion-valve, the steam inside the cylinder expands during the completion of the stroke, and in proportion to the degree of expansion obtained in the small cylinder is the whole expansion of the steam in the two cylinders determined; *i. e.*, if the capacities of the cylinders *a*, *c*, are as one to four, and the steam is cut off at half-stroke in the small cylinder, then the expansion of the steam which, in the ordinary mode of working with the two cylinders, would only be four times, is doubled, and becomes eight times the volume of the dense steam admitted at each stroke into the small cylinder, and so on in proportion for any other limitation of the supply by the expansion-valve.

The patentee does not claim the application of expansion-valves to steam-engines, as they have been heretofore used to intercept the passage of the steam in the steam-pipes; nor does he claim any part of the double-cylinder steam-engine, to which the said valves are applicable; but he claims the application to the double-cylinder condensing steam-engine of the peculiar arrangement of the two valves hereinbefore described, combined with their two separate tumbler motions, as the most efficient mode of expanding steam in the small cylinder of a double-cylinder steam-engine.—[*Inrolled in the Inrolment Office, May,* 1846.]

To George Ewart, *of the New Road, in the county of Middlesex, zinc manufacturer and plumber, for improvements in the manufacture of chimney-pots.*—[Sealed 3rd November, 1845.]

This invention consists in constructing chimney-pots of two tubes, one sliding upon the other, and capable of being fixed at any desired height by the aid of thumb-screws and nuts, or by other convenient means. The material which the patentee prefers to use for making the chimney-pots is zinc, as it is durable, cheap, and light. The advantage arising from this invention is, that it gives the power of increasing the draft of a chimney by increasing its height.

The patentee claims, as his invention, the mode, above described, of constructing chimney-pots, each composed of two parts or tubes, one sliding over the other.—[*Inrolled in the Inrolment Office, May,* 1846.]

To James Taylor, *of Lochwinnoch, in the county of Renfrew, carpet and rug manufacturer, for certain improvements in the manufacture of carpets, rugs, and piled fabrics.*—[Sealed 10th October, 1845.]

These improvements in the manufacture of carpets, rugs, and other piled fabrics, refer to that class of fabrics produced by cementing the pile to strong cloth (forming the back of such fabric) by means of India-rubber or other suitable adhesive substance. The difficulty experienced in arranging the lengths of wool or worsted yarn, used in this manufacture, to form the pile, so that their ends shall form any desired pattern, has long prevented the successful working of this method of producing piled fabrics; but by the present improvements it is stated that given lengths of differently colored yarn may be laid down, in such quantities as will admit of any required pattern being copied with precision and rapidity.

In Plate VI., are several views of the apparatus employed for the above-mentioned purpose. Fig. 1, represents in elevation, and fig. 2, in plan view, an arrangement of machinery, somewhat similar in construction to the bed and slide-rest of a lathe, for winding up the variously-colored threads which are to form the pile of the fabric to be manufactured. *a*, *a*, is a cast-iron bed, the edges of which are planed true. *b*, *b*, are standards for supporting the bed *a*, which is provided at one end with an adjustable head-stock *c*, similar to that of a common turning lathe, and at the other end with a fast head-stock *d*. *e*, is a spindle, having its bearings in the head-stock *d*, and carrying on its outer end a wheel or pinion *f*; its inner end is provided with a square socket *g*. *h*, is a beam or roller, which may be made either of metal or wood; but if of wood, it is preferred to be composed of strips joined together, in order to prevent the beam from warping. This beam receives upon its surface a coating of worsted thread or yarn, which is to form a portion of the piled face of the fabrics to be produced; it is furnished at each end with a centre-pin, one of which is made square to fit into the socket *g*, and the other is hollowed to receive the centre-pin of the adjustable head-stock *c*. In the face of the roller *h*, and at opposite sides to each other, two longitudinal grooves 1, and 2, are cut (see fig. 3,), which reach from end to end of the roller. One of these grooves is intended to receive a stud 3, projecting from the inner face of a flanged collar *i*, (see fig. 4,) which fits into the roller for the purpose to be hereafter explained, and the other groove is for receiving a hooked wire *j*, for holding the ends of the several worsted threads while being wound upon the roller. The collar *i*, has an opening 4, in its circumference, on the opposite side to that of the stud, and when placed upon the beam comes in a line with that groove which receives the wire *j*, before mentioned. *k*, is a screw, mounted in bearings attached to the bed *a*, of the apparatus, and has a cog-wheel *l*, keyed on its outer end, which takes into the pinion *f*. This screw *k*, passes through a female screw, which is bolted to the under side of a saddle *m*, and when made to rotate by manual or other power, causes the saddle *m*, to traverse the bed-plate in the manner of the slide-rest of a lathe. From the upper face of the saddle two studs 5, 5, project, which are intended to fit into the groove of the collar *i*, (see fig. 5,) formed by the flanges before mentioned. By this means the saddle *m*, when it traverses the bed *a*, will draw the collar *i*, over the roller or beam. *n*, is a bent arm attached to the saddle *m*, and carrying on its upper end a hook similar to the end of a flyer, for the purpose of guiding the yarn whilst being wound upon the roller. *o*, is an index-hand, which points to the graduations on a table *p*, in order to shew the workman the progress of the winding on operation.

Having described the various parts of the machine, the patentee proceeds to shew the manner of working the same. Suppose a number of bobbins containing woollen yarn of different colors to be suspended above the machine, and a strip of paper containing one row of a pattern of a carpet, squared and colored similar to a pattern for Berlin wool work, to be laid on the table *p*, the workman turns the screw *k*, in order to bring the saddle *m*, to the left-hand end of the roller *h*. A thread is then drawn down from a bobbin (containing say red worsted), passed through the hook or guide on the end of the arm *u*, and tied round the roller *h*. Rotary motion is then given to the screw *k*, by a handle on its end, and by means of the cog-wheel *l*, and pinion *f*, on the spindle *e*, the roller *h*, is caused to revolve and take up the thread on to its surface. When two or three coils are wound on the roller *h*, the wire *j*, is slidden into the groove 1, of that roller, just below the cut 3, in the collar *i*, and it is held in its place by the thread which has just been wound on the roller, and covers part of the groove. It will now be understood, that as long as the screw revolves, the movements of the saddle *m*, and the roller *h*, will be continuous, and that their respective speeds may readily be adjusted by changing the gearing *l*, and *f*, as required.

From the foregoing description it will likewise be seen, that as the saddle *m*, traverses the bed *a*, the index-hand will be carried forward over the colored pattern, and shew the workman when to cut off the red thread, and commence winding on the next color, say blue. The arm *n*, and the collar *i*, will be also carried forward, and at the same time the collar *i*, will rotate with the roller, by reason of the pin 4, on its inner surface, which projects into the groove 2, and guides the collar as it slides along that roller. Let it now be supposed that the index-hand *o*, has passed over the first red portion of the pattern, and indicates blue, as the next color, the motions of the machine are suspended until a blue thread is brought into the machine. To effect this the workman cuts off the red thread, pulls down from a bobbin above one of blue, ties a knot in the thread, and passes it under the wire *j*, and into the guide of the arm *n*. Rotary motion is again communicated to the machine, and continued until the index-hand points to another color, when a similar change of thread is effected, according to the pattern on the table *p*. The changing of the threads is thus continued until the roller is filled with colored threads or yarn, forming a counterpart to the pattern on the table. By the time the surface of the roller is covered, the collar *i*, will have traversed the whole length of the roller, and slidden off at the end; the centre-pin of the head-stock *c*, must then be drawn back to allow of the roller being taken out of the machine. Another roller is then mounted in its place, and the next succeeding strip of pattern being exchanged for that which was previously on the table, the workman can proceed as before. The use of the collar *i*, is to compress the threads laterally as they are wound upon the roller, for if the pattern or design be eight lines, or a greater or less number of lines to the inch, the collar, by resisting the lateral spreading of the worsted or woollen threads, will cause the thread to rise on the surface of the roller to the extent of an eighth of an inch, or in the same ratio, more or less, according to the size of the pattern, or the number of lines it may have to the inch. The necessary pressure on the yarn is given by a relation subsisting between the wheels connected with the main screw and beam or roll, as well also as by regulating the thickness of the line of wool, and the speed of the main screw. As the collar *i*, traverses the roller, the hooked wire *j*, must be drawn forward by the operator, to prevent its being buried in the thread. The beam or roller *h*, having received a coating of wool, as above explained, two narrow strips of wood or metal, of the length of the roller, are affixed thereto, one on each side of either of the grooves, by pins or otherwise. A knife is then passed up the groove, thus enclosed, to cut the coil of wool into lengths. The roller is now ready to be stripped of the wool, and for this purpose it is taken to the machine, represented in front view, partly in section, at fig. 6. In this machine the wool, as it is taken off from the rollers, is laid out flat in layers to form any desired pattern, and when "built up" or formed into a compact body, the wool is forced forward, and brought into contact with the edge of a sharp rotary knife, which will slice it into sheets after the ends of the threads of wool have been cemented to a strong cloth or other suitable fabric. Fig. 7, represents the machine in end elevation. It consists of a platform or flooring *a, a,* mounted on four grooved wheels *b, b,* which are intended to traverse a railway on the ground. On each side of the flooring are two standards *c, c,* attached together by the cross-pieces *d, d,* and the back *e*, which is closed; the front of the machine being open, as shewn in the drawing. *f, f,* are side pieces firmly bracketed to the platform or flooring, and carrying each a bracket on their upper end, in which grooved wheels b^1, are mounted. These wheels have also a bar over which they run, and they are intended, together with the wheels *b*, to guide the machine forward and backward, as will be hereafter described. *g, g,* are four vertical screws, having their bearings in the flooring *a*, and the cross-pieces *d, d.* These screws pass through the sockets *h, h,* which are temporarily fastened to the ends of a table *i, i*; and being made to rotate simultaneously, will, by taking into a worm made on the inner face of the sockets *h*, for that purpose, cause the table to ascend or descend as required. At the upper end of the standards *c*, *c*, are brackets, which carry the rollers *k*, *k*, one on each side of the machine. Upon each of these rollers a thin sheet of copper, and also a sheet of cloth (both of a suitable length), are wound, and so attached thereto, that when unwound the sheets may be readily unfastened, to allow of the rollers and their brackets on the front of the machine being removed. The sheet of cloth is wound on with the copper in such a manner, that when drawn into the machine, it is against the side of the worsted. One end of these sheets is attached to the table *i*, *i*, the descent of which causes the sheets to unwind from the rollers. Above the cross-pieces *d*, *d*, on each side of the machine, is a metal bar *l*. These bars serve as guides, as will be presently explained, and are so placed that the sheets of copper may pass beneath them when unwinding. When a beam or roller, covered with the wool or worsted yarn, coiled round its surface, is brought to this machine to have the wool taken off and laid down flat, the table *i*, *i*, is brought up to the top of the machine, and one of the strips of wood or metal, fixed on the beam or roller to keep the threads even while being cut, is taken off; the beam is then rolled along the guides *l*, which steady it and keep it even in its progress to the back of the machine. In this manner the wool is unlapped from the beam, and the second strip of wood or metal being taken therefrom, the threads are altogether detached from the roller and laid flat and even on the table *i*. Every succeeding beam is in like manner stripped of its wool, until a sufficient number of layers are placed in the machine to make up the pattern required. As the layers of wool are placed above each other the table *i*, is proportionably depressed by means of the screws, so that the surface of the uppermost layer of wool shall be at the height the table was at the commencement of "building up" or forming the body of woollen threads.

The mode of actuating the four vertical screws will be best seen at fig. 8, which represents the gearing employed for that purpose, as if seen from below. Upon the end of the shafts of the screws *g*, a concave toothed worm-wheel *m*, is keyed. These wheels are actuated by the endless worms *n*, upon the horizontal shafts *o*; and on one end of these shafts *o*, the bevil-wheels *p*, are keyed, which take into bevil-wheels *q*, mounted on the short rod *r*, suspended by brackets from the platform *a*, as shewn in the drawing. On the other end of these short rods similar bevil-wheels are keyed, which are actuated by a bevil-wheel placed between them, and mounted on the upright shaft *s*, at the upper end of which a handle for working the gearing is provided. It will now be evident, that on turning the handle of the shaft *s*, the vertical screws *g*, *g*, will revolve simultaneously, and cause the table *i*, to rise or fall to any required distance.

When a sufficient number of layers of worsted, to form the pattern of the fabric to be made, is placed in the machine, the table *i*, is brought down to the platform *a*, and the sockets are removed from the sides of the table, so as to allow of the free action of the screws without reference to the table. A presser-head *t*, is then placed in the machine on the top of the wool, and sockets, similar to those attached to the table *i*, are also fastened to the ends of this presser-head. On rotary motion being communicated to the screws, the presser-head (by reason of the screws taking into the thread on the inside of the sockets) will be brought down, and made to compress the mass of woollen yarn or thread into a proper consistency.

The next operation is to cause the ends of the woollen yarn to protrude a certain distance from the front of the machine, so that the cement of India-rubber or other adhesive substance may be applied. This forward motion is effected by the advance of a back-board *u*; a number of screws *v*, *v*, (which have their bearings in sockets in the back of the machine) being made to rotate simultaneously and press against the back-board. The mode of actuating the screws is by passing a chain *w*, over a toothed wheel *x*, keyed to the shaft of each of the screws *v*. In this case the screw v^1, must have a reverse thread to the others. The copper sheets serve to reduce the friction of the wool in passing out of the machine when the pressure of the back-board is applied. It will be obvious to any practical mechanic that various plans may be devised for forcing forward the wool in an even and uniform manner; but to this, as well as the mode of cementing the threads to the cloth or fabric which is to form the back of the rug or carpet, the patentee lays no claim, as such part of the process may be performed in the way heretofore practised. After the cementing has been effected, and the fabric is ready to be cut off, the machine is advanced along the railway, in order to bring the wool, which stands out from the machine, into contact with a large rotary knife (see fig. 9,), mounted in an iron framing. By this means a slice of wool will be cut off from the main body of the threads; the machine being made to advance gradually, and pass the face of the wool against the edge of the knife. The fabric, as it is cut off by the rotary knife, is wound up by vertical rollers, one of which is shewn at fig. 9, and may then be taken away to be shorn, if thought desirable.

The patentee claims, First,—the employment of a beam or roller for winding on the threads or yarn of wool or worsted, to form the pile of cemented pile fabrics, as above explained; and also the use of the collar for compressing the threads laterally while being wound on the beam or roller. Secondly, —the manner herein described of laying such coils of threads out flat in layers, ready to be worked up into piled fabrics, as required.—[*Inrolled in the Petty Bag Office, April,* 1846.]

Specification drawn by Messrs. Newton and Son.

To HENRY SCHLOSS, *late of Finsbury-square, in the county of Middlesex, but now of Paris, in the kingdom of France, Gent., for an improved instrument or instruments for producing ignition.*—[Sealed 12th January, 1846.]

THIS invention consists of a portable apparatus to be used by travellers, miners, smokers, and others, for effecting the combustion of any material which will easily ignite by friction.

In Plate VII., fig. 1, is a perspective view of the apparatus. *a,* is the outer case or box, which is closed by a sliding lid; *b,* is a chase, secured to one side of the box, and containing a helical spring *c,* furnished with a square cap *d,* which is pressed down into the chase *b*, until a small pin *e*, projecting from one cheek of the cap, is caught by a catch *f*, on one side of the chase. *g*, is an angle-piece, fixed to the same side of the box as the chase *b*; and *h*, is a slide (shewn detached at fig. 2,), which is passed through the side of the box, and between the end of the chase and the piece *g*. The slide *h*, is furnished at its inner extremity with a small stop *i*, to prevent its being drawn entirely out of the case. *j*, is an angle-piece, similar to *g*, but fixed at the opposite side of the box, having a spring *l*, attached to it; *m*, is a spring-slip (shewn detached at fig. 3,), inserted between the chase *b*, and the side of the box, and fastened to the latter, at one end, by a screw *n*; at the other end of the piece *m*, there is a projection m^1, which takes into a notch or recess in the lid of the box, and secures the same: the lid is released by pressing down a button *o*, the stem of which passes through a groove in the side of the box, and is fixed to the end of the slip *m*. *p*, is a receptacle for the matches, which, by preference, are formed of "amadou" or German tinder, which is prepared by steeping the plant called the ***boletus igniarius*** in a strong solution of saltpetre; but any other substance easily ignited by friction may be employed.

The space between the cap *d*, and the slide *h*, is filled with matches from the compartment *p*; and when a light is required, one of these matches is ignited in the following manner:—The button *o*, is first pressed down, so as to unfasten the lid of the box, which is then removed; the slide *h*, is next drawn out; after which, the pin *e*, is released from the catch *f*, and the spring *c*, immediately forces the first match into the space previously occupied by the slide *h*; this slide being now driven smartly back, will force the match between the spring *l*, and the edge of the angle-piece *g*, into the compartment *q*, and the friction thus produced will be sufficient to ignite the match.

The patentee claims, as his invention, the instrument or combination of instruments constituting the apparatus, above described, for producing ignition by friction, and however the shape and details of the same may be varied, so long as the peculiar features of the said instrument or apparatus are adhered to.—[*Inrolled in the Inrolment Office, July,* 1846.]

To Joseph Edward Judson, *of Ashton-under-Lyne, in the county of Lancaster, saddler, and* Edward Banton, *of Walsall, in the county of Stafford, commercial traveller, for a certain improvement or certain improvements in covering rollers used in spinning cotton and other threads; also in covering mill-straps.*—[Sealed 9th October, 1845.]

The first part of this invention consists in covering the rollers used in spinning cotton and other threads with an elastic composition, varnish, or japan, which will prevent, either wholly or partially, the formation of permanent indentations or grooves in the rollers by the action of the thread, and by the pressure of the fluted rollers which work against them; it will also prevent, to a greater or less extent, the dragging of the thread which usually takes place with ordinary rollers; another advantage resulting from this part of the invention is, that the composition, varnish, or japan, being impervious to oil, the oil used for lubricating the axes of the rollers is prevented from coming into contact with the woollen cloth that covers the rollers, and impairing its elasticity.

The rollers to be used in spinning cotton, silk, silk-waste, and flax, are constructed in the ordinary manner, by covering an iron roller with a layer of woollen cloth, and afterwards with a layer of leather; the patentees then apply one or more coats of the composition, varnish, or japan employed in manufacturing the varnished or japanned leather known as enamelled or patent leather, or of the composition, varnish, or japan used by japanners, or any other composition, varnish, or japan which possesses sufficient elasticity. Instead of covering the rollers with plain leather, and afterwards varnishing the same, they may be covered with a layer of enamelled or patent leather, or of leather which has been coated with an elastic composition, varnish, or japan, and a coat of varnish applied over the seam or joint of the leather, and at the ends of the roller. Or the rollers may be covered with a layer of linen or other fabric, in place of the leather, and have the varnish or japan applied thereto.

In applying this invention to the wooden rollers used in spinning wool, the patentees coat pieces of leather with the composition, varnish, or japan, and cover the rollers therewith; the seam or joining, and the edges, being afterwards coated with varnish or japan. Or unprepared leather may be used for covering the rollers, and then varnished. Instead of leather, strong cotton or woollen felt máy be employed, and coated either before or after its application to the rollers.

The second part of this invention consists in covering the leather straps or bands used for driving machinery with any of the elastic compositions, varnishes, or japans before mentioned, which will render them impervious to water and more durable: the varnish or japan is applied to one or both sides of the leather, and either before or after it is made into straps. It also consists in covering driving-straps or bands, made of woollen or cotton felt, or of linen or cotton tape, with any of the above compositions, varnishes, or japans, and by this means rendering them impervious to oil and water, and more durable.

The patentees claim, Firstly,—the coating or covering of rollers used in spinning cotton, silk, silk-waste, flax, and other fibrous substances into threads, with a stratum or layer of an elastic composition, varnish, or japan, for the purpose of wholly or partly preventing the formation of the permanent grooves or indentations on the said rollers; whether the said rollers be covered with any of the compositions, varnishes, or japans hereinbefore enumerated, or with any other suitable composition, varnish, or japan. Secondly,—the method of constructing rollers for spinning cotton, silk, silk-waste, flax, and other fibrous substances, by first covering the said rollers with a stratum or layer of woollen cloth, and afterwards with a stratum or layer of cotton or linen, and afterwards with a stratum or layer of any of the elastic compositions, varnishes, or japans hereinbefore enumerated, or with any other suitable composition, varnish, or japan. Thirdly,—covering the rollers used for spinning wool with an elastic composition, varnish, or japan; whether the said rollers be previously covered with leather, or with cotton or woollen felt, and whether the said elastic composition, varnish, or japan be applied to the said leather, or cotton or woollen felt, previous to the fastening of the same to the said rollers, or to be applied to the said leather, or cotton or woollen felt, after the same has been fastened to the said rollers, as above described. Fourthly,—the coating or covering of straps or bands for driving machinery with an elastic composition, varnish, or japan; whether the said straps or bands are made of leather, or of cotton or woollen felt, or of linen or cotton tape, or of any other suitable material.—[*Inrolled in the Inrolment Office, April,* 1846.]

To Henry Page, *of Cambridge, in the county of Cambridge, painter, for certain improvements in the mode of painting or decorating with oil and other colors.*—[Sealed 30th January, 1845.]

This invention consists in producing a cuticle or skin, composed of the materials commonly used in painting, and in applying such skin of paint to the surfaces required to be decorated or ornamented.

The mode of preparing the cuticle is as follows:—Paper of the ordinary description is coated with size, or diluted glue of the finer description, or any of the preparations of gelatine as produced by glue, isinglass, linseed, gum-arabic, or any other matter of which a size can be made that will readily dissolve in water; but, as the common preparations of size are not sufficiently soluble in water, the patentee adds thereto a quantity of treacle; he prefers a size made by mixing gum-arabic with about an equal quantity, by weight, of treacle, and then reducing the mixture to a liquid state, so that it may be worked freely with painting brushes. One coat of the mixture, sufficiently thick to bear oil colors, is applied to the paper, in a similar manner to painting. When this is dry, a coat of oil color is laid on (care being taken to prevent the edges of the paper from being covered with the oil color); and as soon as the coat of oil color is dry, a second coat of the same is applied; and when the second coat of color is dry, the cuticle will be of sufficient firmness, and have a suitable surface for receiving any required designs or devices. After the designs or devices have been produced upon the cuticle, it is laid upon a plane and smooth hard surface, with its face or painted side downwards; the back of the paper (which is uppermost) is then moistened with water until the coat of size and treacle is so dissolved or softened that its adhesion to the coat of oil paint is destroyed, and the paper can be easily removed. A cuticle or sheet of paint then remains, and before it is taken from the plane surface on which it has been spread, any size that may yet remain must be carefully cleaned off; this is effected by means of sponges and water, and the surface is finished with the fine and soft leather known as washed leather,

The cuticle thus made is attached to the surface required to be decorated or ornamented in the following manner:—The surface is first thoroughly cleaned by the means in common use among painters, termed "rubbing down;" and it then receives a coat of oil paint, or gold size, or any elastic varnish, or boiled linseed oil; but the patentee prefers to use boiled linseed oil, with the addition of a small quantity of japanners' gold size. Only a small quantity must be laid on the surface which is being operated upon, and it must be spread or driven thinly thereon, or what is commonly termed "driven out." The cuticle or skin is then applied to the surface, and attached to the same by firmly pressing it in contact therewith by the operation of rubbing. The pressing or rubbing should commence at the centre of the skin, and thence proceed towards the edges, expelling any air that may remain between the skin and the surface of the work.

In carrying out this invention, any papers or fabrics which can be separated from the cuticle of paint, after it is made, may be used.

The patentee concludes his specification as follows:—"I claim, as of my invention, the particular modes of arrangement and action, and the particular combinations of parts and materials, together with the principles of management upon and according to which such particular modes of arrangement and action, and such particular combinations of parts and materials, are made, and by which the same are carried into practical effect; such, the modes of arrangement, combinations of parts and materials, and principles of mananagement, being in the manner as I have hereinbefore specified, described, and set them forth."—[*Inrolled in the Inrolment Office, July,* 1845.]

To Edward Dell, *of Woolwich, in the county of Kent, wine merchant, for certain improvements in apparatus for heating and warming.*—[Sealed 4th December, 1845.]

This invention relates to that class of apparatus in which the heating or warming is effected through the medium of certain bodies, such as water, steam, or air, instead of the direct action of fire; it consists in enclosing the tubes, flues, or other vessels that contain such bodies, in suitable casings, perforated with numerous holes, through which the cold air enters, and after coming into contact with the tube or other vessel, re-issues in a heated state.

In Plate V., fig. 1, is a longitudinal section of an apparatus for warming beds, feathers, grain, &c. *a*, is a metal cylinder, filled with boiling water through an aperture at one end, which aperture is closed by a plug *b*; the cylinder *a*, is enclosed in a perforated metal case *c*, and kept in the centre of the same by stays *d*, so as to leave a space of about half an inch between the cylinder and case; *e*, *e*, are handles by which the apparatus is carried. Fig. 2, is an external elevation of an apparatus constructed on the same principle, and to be used for warming bed-rooms, libraries, halls, &c. Fig. 3, is a vertical section of a smaller and more portable apparatus than the preceding, in which the hot water cylinder and its perforated case are made to fit loosely into the pedestal, so as to be readily detached therefrom when required. Fig. 4, is a vertical section of a hot water foot-warmer, suitable for carriages, churches, and other like uses. The perforations are generally about one-eighth of an inch in diameter, and situated at a distance of from half an inch to one inch apart.

Instead of only one perforated case, two or more such cases, with suitable spaces between them, may be sometimes used with advantage; as for example,—for enclosing hot-air stoves. And also in place of the outer cases being composed of perforated metal plates, they may be made of wire-work or wire-gauze.

The patentee states, that although he has described the hot water cylinder as consisting of metal, he does not limit himself thereto, for, in some cases, glass or earthenware may answer equally well; neither does he confine himself to the particular number, situations, or dimensions of the several parts. He claims the enclosing of those descriptions of apparatus for heating and warming, in which the heating or warming is effected indirectly through the medium of water, steam, air, or other like bodies, within outer perforated casings, fixed at suitable distances apart, as exemplified in the several varieties of apparatus hereinbefore described.—[*Inrolled in the Inrolment Office, June,* 1846.]

To Alexander Haig, *of* 45, *Great Carlisle-street, Portman-market, engineer, for certain improvements in machinery for ventilation and other similar purposes to which the said machinery can be applied.*—[Sealed 4th September, 1845.]

This invention consists in the construction and arrangement of certain machinery and apparatus whereby furnaces, mines, and other places containing combustible, noxious, or unwholesome gases and vapours, may be ventilated and supplied with suitable air.

In Plate VII., fig. 1, is a vertical section, and fig. 2, is a transverse section of a centrifugal blower, shewing the interior centre chamber, in which *a*, is a rotating fan, with two or more blades; *b, b,* are openings through which the air or gases to be withdrawn enter the centre chamber through the pipes *c, c,* connected with the two side chambers *h, h*; *d,* is the exit pipe leading from the centre chamber of the blower, which, in figs. 3; and 4, is shewn branching off into and terminating in the ash-pits *o, o,* of the furnace. *e,* is a horizontal shaft, which carries the fan *a, a,* and may be driven by manual labour applied to the handle *f,* in conjunction with the spur-wheel and pinion 1, and 2. *g,* is a rigger, secured to the opposite end of the shaft *e,* capable of being driven by a band or strap from an engine, or other rotary power, instead of by manual labour, as just described. The two chambers *h, h,* communicate with the pipe *j, j,* furnished with a slide-valve or cock *k,* to regulate the volume of atmospheric air entering the vertical pipe; which volume of air being divided by a split-draft at *z*, passes into the chambers *h, h,* and combining with the air or gases drawn from the furnaces, the whole is conducted into the ash-pits (see figs. 3, and 4,), by the pipes *d, d.* The end of each pipe is furnished with a valve *n*, intended to be closed by the hand-rods *m, m,* in the ash-pits *o, o,* when the furnaces are being supplied with fuel, or clinkering the bars, or other such operations, requiring the furnace doors to be opened. It will now be understood that, as the side chambers *h, h,* receive the exhausted gases through the pipes *c, c,* these gases will combine with a due proportion of atmospheric air entering the chambers by the pipe *j, j,* (its volume being regulated by the slide-valve *k*); the diluted gases will then pass through the openings *b*, and finally escape by the pipe *d*, into the ash-pits *o, o.* The outer ends *p, p,* of the blower are continued below the cylinder, and thus serve for standards to support the apparatus; the projecting flanges permitting its being bolted down in any required position, as on the steamer's deck, steam chest, or other situation.

Fig. 3, is a sectional plan of a boiler (six furnaces being placed side by side), and fig. 4, is a vertical section of the same; *s, s,* represent the furnace bars; *o, o,* the ash-pits and flues; *r, r,* the fire-lumps; *n,* the valves of the exit pipes *d;* and *m,* the rods for opening and closing the same. *t, t,* are pipes leading from the furnace ash-pits for conveying away the non-inflammable gases through the pipe *q, q.* *w, w,* is an evaporating pan, into which the hot cinders, ashes, &c. fall, and are immediately cooled by the water contained therein, which assists in preserving the bars from rapid destruction. In fig. 4, the centrifugal blower is shewn, as standing over the exit flue of the boiler, and secured to the steam chest c^2, in which position the blower collects all the gaseous products evolved from the furnaces (instead of their escaping into the chimney or funnel in the usual way) through the pipes *c, c;* the atmospheric air entering, as in figs. 1, and 2, through the pipe *j*, and the regulating valve *k*. The centrifugal blower, although shewn as applied to marine boilers, may be placed in any more convenient position, whether applied to marine or land boilers, or other furnace exit flue.

x, is the shaft of the driving-pulleys *y*, *y*, by which any required velocity may be given to the fan, through the friction-band *i*, *i*, *i*, in the usual manner.

The patentee having described his drawings, proceeds to state the various purposes to which his improvements may be applied; and first, with reference to the particular arrangements and application shewn in the drawings, which are intended to effect, by the combined operations of exhaustion and condensation, the ventilation of close air furnaces, and the combustion of the inflammable gases generated therein, and to allow of the discharge of the refuse products of combustion through and from the ash-pit. The exhausting process of the ventilation collects the inflammable and non-inflammable gases evolved from the fuel undergoing decomposition into the case of the blower (at a temperature little short of that at which hydrogen gas ignites), where, being combined with a due proportion of atmospheric air entering the case of the blower at a suitable opening (the volume of atmospheric air so admitted being regulated by a valve, according to the quantity of air in the particular furnace), the mixture of the gaseous products and atmospheric air is, by the condensing action of the blower, driven into the ash-pit or pits, where the non-inflammable gases are discharged through a suitable pipe, adapted with a regulating pipe or valve to each ash-pit; all other external openings being sealed from the atmosphere. The non-inflammable products from the ash-pit may be discharged at any convenient level, which on ship-board would be either on the larboard, starboard, or on both sides, or at the stern of the vessel, depending upon the number and situation of boilers and furnaces employed; and as the velocity of the draft produced by the means above described may exceed that of a chimney-shaft, such shaft may be altogether dispensed with. The principle of action of the arrangement above described is thus recapitulated by the inventor:—The gaseous products evolved during the fuel's decomposition, are, by the exhausting power of the centrifugal blower, collected in its case at a high temperature, when the requisite volume of atmospheric air enters the case of the fan, through an adjustable area of opening, where, mixing with the inflammable and non-inflammable gases, the aggregate volume is driven by the fan into the ash-pit (or as many ash-pits as there may be) in regulated volumes; the inflammable gases passing through the fire-bars are ignited, and the excess of non-inflammable gases is discharged by a pipe leading from the ash-pit to any convenient situation.

It is by the aforesaid continued action of exhausting and condensing that the ventilation of a close furnace and the combustion of the inflammable gases are effected; the evolution of smoke into the atmosphere is thus prevented, and the necessity for a chimney-shaft for obtaining the necessary draft is also superseded. As the temperature of the combined gases entering the ash-pits will be considerable, this heat, in addition to that produced by cinders, &c., falling through the fire-bars, in conjunction with the high temperature acting on their upper surfaces, would be very detrimental; water is therefore introduced into the bottom of such ash-pits, whereby, from its evaporation and cooling of the hot cinders, the inconvenience referred to is said to be obviated. The arrangements shewn in the drawing, for the purpose of ventilating close furnaces, may be applied, with slight modification, for various other useful purposes, when it is required to withdraw air or gaseous products, and introduce an equal volume of air or gas. If the air or gas, to be so introduced in place of that which has been withdrawn, is to be introduced without mixing with that which has been so withdrawn, as in the case of ventilating a coal mine, a room, or the hold of a ship, or other place, the pipe *j, j,* with its valve, &c., on the top of the blower, will be unnecessary; and the exhausting-pipes *c, c,* must be conveyed into the place containing the vitiated air, or noxious gas and vapour, which, by the rotation of the fan, will be drawn into the chambers *h, h,* and from thence into the centre chamber, when it will be discharged by the pipe *d,* into the atmosphere, or conveyed away to any suitable spot; while an equal volume of pure air will enter the place thus ventilated, either through natural openings, or by a pipe laid into the place from whence the noxious air, gases, or vapours may be removed, as aforesaid. The pipe *j, j,* with its valve *k,* on the top of the blower, must not be employed for ventilation in such cases; but this opening may be employed instead of the pipes *c, c,* in which case the latter would be abandoned; or the pipe *j, j,* may be employed as an additional exhausting pipe, in connection with another communication to the place from which the noxious matter is to be withdrawn. The exhausting pipes *c, c,* may communicate with several pipes of smaller diameter, conducted or leading to the part of the mine or apartment in which the noxious matter is principally generated.

The patentee states that he does not claim the mixing of gaseous products with air in furnaces, or the exclusive use of the several separate parts of the machinery and arrangements shewn in the drawings; but he claims, Firstly,—the construction and arrangement of machinery and apparatus, whereby close furnaces may be ventilated, as above described; and, Secondly,—the combination of the chamber containing the centrifugal blower, and of a chamber on each side of such blower, in connection with exhausting and discharge pipes, and the application thereof to ventilation and other purposes, as above described.—[*Inrolled in the Petty Bag Office, March,* 1846.]

To JOHN TAYLOR, *of the Adelphi, in the county of Middlesex, Gent., for improvements in separating metals from each other, and from certain combinations with other substances,— being a communication.*—[Sealed 15th April, 1845.]

THIS invention relates to the separation of silver from ores or metallic combinations containing that metal, which the patentee proposes to effect by either of the two following methods:—Firstly, by forming a chloride of silver, then dissolving it by any of the solvents hereafter mentioned, and afterwards precipitating the silver from the solution; or, secondly, by converting the whole, or as much as is practicable, of the silver, contained in an ore or regulus, into a sulphate of silver, by a process of calcination, and then dissolving the sulphate of silver in hot water—the other metals contained in the ore being rendered insoluble.

The argentiferous materials to be treated according to the first part of this process may be divided into two classes: those containing sulphur, and those which do not contain sulphur. As regards the sulphurous material, if it be a regulus of copper or iron, the patentee prefers first to granulate it, by allowing it, when in a hot state, to flow into water; it is then calcined in a furnace similar to those used for calcining copper regulus, for from twelve to thirty-six hours, according to the nature of the regulus under operation and the quantity in the furnace; after which it is ground, and passed through a fine sieve: during the calcination a moderate fire should be kept up, sufficiently low to prevent the regulus from caking; and the material should be stirred every two hours. The object of this process is to evaporate a portion of the sulphur, and thus almost entirely prevent the caking of the material in the subsequent calcination. In the same manner, sulphurous ore, which it might be inadvisable to melt, from its being already sufficiently rich in silver, and needing no concentration, would be most advantageously treated by calcining it as above described, previous to grinding, in order to prevent the formation of lumps in the subsequent calcination.

The operation of calcining the ore or regulus, after the above treatment, is carried on in a simple reverberatory calcining furnace; the heat, on the introduction of every fresh charge, should be moderate, and gradually increased to a bright red heat, approaching yellow; the operation generally lasts from two to three hours, and during this time the material must be constantly raked, for the purpose of thoroughly oxidizing the copper, iron, and other metals contained in the ore or regulus. The state of the material operated upon should now be tested, by withdrawing a small portion of it, and, while still hot, pouring water upon it; if the water is then colorless, the material has been sufficiently calcined; but if the water should be blue or green, the calcination must be continued. When the sulphates of copper and iron have been decomposed, chloride of sodium, or any other suitable chloride, is to be added, in the proportion of four or five parts of salt to one hundred parts of the substance treated;

the heat of the ore or regulus should be reduced previous to the addition of the salt, in order to prevent too great evaporation and loss of chlorine; and on the salt being added, the material should be well stirred for some time, and a degree of heat maintained sufficient to cause the chlorine or muriatic acid to rise in almost invisible fumes, in which the material should be allowed, as it were, to soak. The material may now be again tested, to prove whether the calcination has been thoroughly performed, by withdrawing a small portion from the furnace, and pouring over it a hot saturated solution of chloride of sodium; if the solution, thus obtained, be clear and colorless, and becomes of a whitish color when cold water is added, the calcination is complete; but if the solution is blue or green, the calcination must be continued. The operation may be hastened by strewing over the material in the furnace another half pound or pound of common salt for every hundred pounds of the material; and the whole must be constantly stirred. So great is the affinity of silver for chlorine, that it has been found sufficient, in many instances, to rake the material which has been calcined out of the furnace, and mix it with salt, while hot; and chloride of silver has been thereby produced.

If the ore or regulus does not contain any sulphur or other substance which it is necessary to volatilize or oxidize by the above calcinations, common salt, in the proportions before given, may be at once added, and the material placed immediately in the furnace, and treated in the manner above described, for producing a chloride of silver, beginning from the point at which the common salt is added.

A chloride of silver having been thus formed, the ore or regulus is to be washed or lixiviated with a hot saturated solution of chloride of sodium or other suitable chloride, or with a solution of hyposulphate of soda, potash, or other alkali or earth, which will dissolve the chloride of silver, and thus separate it from the insoluble portions of the ore or regulus. From this solution the silver may be precipitated by any of the known methods;—precipitated copper may be used with advantage for effecting this operation. If the material thus treated has been copper regulus, some chloride of copper will remain in the solution, as also if copper has been used for precipitation; in this case, the solution from which the silver has been precipitated may be introduced into vessels containing iron, free from oxide, and the copper will then be thrown down, together with any silver that may have remained in the solution; and the copper thus obtained may be employed for precipitating the silver, as above mentioned. If it be desired to economize the salt used in this process, the lixiviated residue may be further washed, and the liquor preserved, together with that obtained from the precipitation; and, after being brought up to the point of saturation, it may be again employed for the extraction of further quantities of silver.

The second part of this invention is carried out in the following manner:—If the material to be treated is a sulphurous ore or regulus, it is to be subjected to a preparatory calcination, as in the treatment of ore or regulus for forming chloride of silver; in fact, this part of the invention may be considered to begin when the ore or regulus has been finely pulverized, after its calcination. The ore or regulus is then placed in a calcining furnace, in which it is acted upon by a current of atmospheric air, and is kept constantly raked; this operation generally lasts about three hours, commencing at first with a moderate heat, and gradually increasing to a full red heat, approaching yellow. During the operation the state of the material must be constantly tested, by withdrawing a small portion from the furnace, and pouring water upon it whilst hot, or else hot water must be used; a few grains of common salt must then be added, and if the operation is not complete, the solution, which was at first green, will be changed by the salt to blue; when only a small portion of the silver has been formed into a soluble salt by the calcination, it will simply cloud the solution when salt is added; but when the calcination is complete, the chloride of silver will be thrown down in thick white flakes on the addition of salt. The material being now removed from the furnace is lixiviated with boiling water, and the silver is precipitated from the solution by any of the known methods.

Sulphurous ore or regulus may also be treated in a calcining furnace, after being pulverized, without any previous calcination; in this case, a very slow heat must be employed for the first part of the process, during which time the sulphur, contained in the ore or regulus, undergoes combustion; when the combustion ceases, the process above described, for converting sulphuret of silver into sulphate, begins.

If it be desired to treat an ore by the sulphate process which does not contain any sulphur, and at the same time inadvisable to convert it into a regulus, a small portion of sulphur in any shape, such as sulphurous copper ore or iron pyrites, may be mixed with it, so as to afford sufficient sulphur to combine with the silver; and the ore may then be calcined as before directed,—particular attention being paid to the test.

The lixiviating apparatus employed by the patentee consists of a round tub fitted with a strainer composed of a perforated disc of wood and a disc of basket-work, covered with linen; and tow is packed round the sides, between the strainer and the tub.—[*Inrolled in the Inrolment Office, October,* 1845.]

To John Constable, *of the city of London, merchant, for certain improvements in the manufacture of gas for lighting and heating,—being a communication.*—[Sealed 24th May, 1845.]

This invention consists in manufacturing carbonic oxide gas from anthracite coal, by subjecting it, when in a state of combustion, to currents of air and steam; it also consists in employing pearl-ash with the anthracite, for the purpose of obtaining other saleable products, and thus reducing the cost of making the gas.

The gas is manufactured by means of a furnace, similar to an ordinary blast furnace; a vertical section of which is shewn in Plate VII. At the upper part of the furnace a plate *a*, is fixed, having a hole at its centre, directly beneath the hopper *b*; through this hopper the charge is introduced, and it is then closed by a valve or slide *c*. The furnace is contracted at *d*, just above the boshes, and below this contraction there is an outlet *e*, to which a pipe is fixed, to conduct the gas as it is generated from the furnace. As the gas is liable to carry off with it a quantity of fine coal-dust and ashes, it is made to pass through several finely perforated metal surfaces, placed at certain distances apart, by which means the dust is intercepted; the gas then passes through a pipe into a gasometer; and from thence it is conducted to the burners, to be used for lighting and heating. *f*, is a pipe, by which a hot blast of air is introduced into the furnace, at a pressure of from three to four ounces per inch. *g*, is a pipe for admitting steam thereto; but care must be taken that the quantity admitted does not cool the furnace down below a very bright red heat: the steam must be first heated to about 600° Fahr., in the same way as air is heated for a hot blast.

If the gas alone is required to be produced, only anthracite coal is introduced into the furnace; then the process consists in simply keeping up the charge as it becomes consumed, and at intervals stopping the admission of the blast and steam, and raking out the ashes at the bottom of the furnace through a suitable opening, covered with an iron plate, which is closed and luted when working. By adding six parts, by weight, of pearl-ash, to ninety-four parts of anthracite, when charging the furnace, saleable products may be obtained from the ashes produced in manufacturing the gas; the process is carried on as before mentioned, and when the lower part of the furnace becomes full of ashes or cinders, they are withdrawn. These ashes or cinders will be valuable as manure, or cyanide of potassium may be extracted therefrom, by repeatedly washing them with water, and evaporating these solutions to obtain the cyanide of potassium in the solid state. Or, instead of removing the ashes or cinders combined with the cyanide, ammoniacal products may be obtained, by allowing steam to flow amongst the ashes or cinders after the blast is stopped; the pipe that leads to the gasometer being first closed, and another pipe (connected with the outlet *e*,) opened, which will carry off the ammonia produced, and bring it into contact with diluted sulphuric acid; or the ammonia may be collected in any other convenient form. The workman can readily ascertain when the ammonia ceases to come off, by opening a hole in the pipe leading from the furnace; and when the ammonia is no longer evolved, the steam is shut off, the ashes removed, and the door closed and luted; the blast of air and the steam are then again admitted, and the process goes on as before.

When using this gas (carbonic oxide) for producing light, the patentee first passes it through one of the hydrocarbons, such as oil of turpentine, in order to increase its brilliancy. When burning the carbonic oxide gas, for the purpose of heating, the patentee prefers to combine it with atmospheric air; this he effects by supplying air from another gasometer or receiver, similar to that which contains the gas, so that the air and gas may be supplied to the burner in equal quantities, and at the same pressure, and be mixed near the burner.

The patentee claims the manufacture of gas for the purposes of light and heat, by causing anthracite coal, in a suitable furnace, when in a state of combustion, to be subjected to streams of air and steam, so as to produce gas, as above described.—[*Inrolled in the Inrolment Office, November*, 1845.]

Scientific Notices.

Report made, in the name of the Committee of Chemical Arts, by M. Bussy, upon an Apparatus presented by M. Briet, under the name of "Gazogène," applicable to the preparation of gaseous waters.

[Translated from the "Bulletin de la Société d'Encouragement," for the London Journal of Arts.]

THE apparatus submitted to the society, by M. Briet, is a domestic apparatus, for the immediate preparation of gaseous water. It consists of two distinct compartments, the upper one of which is intended to contain the liquid to be saturated with gas, and the lower one the ingredients for producing the carbonic acid. These two compartments are fastened together by means of screws.

The carbonic acid is produced by a mixture of pulverized tartaric acid and bicarbonate of soda, in the proportion of 15 parts of the former to 18 of the latter.

In order to impregnate the water with gas, the mixture of the two powders above mentioned is introduced into the lower compartment. That part of the apparatus is then closed by a metallic stopper, the peculiar construction of which constitutes the principal feature of the apparatus. It consists of a hollow cylinder, of pure tin, through which a hollow rod, of the same metal, passes in the direction of its length; this rod projects about 7 or 8 inches beyond the orifice of the lower vessel, and extends down to within an inch of the bottom.

The lower vessel, containing the powder, being closed up, as above mentioned, the upper compartment is filled with water, and turned over, so that the lower vessel may be uppermost; the two vessels are then screwed together as firmly as possible. In this position, the stopper prevents the powders from mixing with the water, and no gas is disengaged; but, on turning the apparatus back into its former position, a portion of the water will flow down into the lower vessel, through the hollow rod; by which means the carbonate is rapidly decomposed, and the gas thereby produced escapes through the stopper, which is covered, for that purpose, with a silver disc, pierced with numerous small holes. The gas will thus pass through the water and become dissolved therein; the portion which is not dissolved collects at the top of the apparatus, where it exerts a pressure, which facilitates the dissolution of a fresh quantity of carbonic acid. This dissolution will be much facilitated by slight agitation, which must always be resorted to when the immediate saturation of the liquid is required. The water, when completely impregnated, may be drawn off by means of a tap, of very simple construction, which is provided with a conical valve (made of tin), fitting tightly into a suitable seat, covered with thick leather, in order to render it water-tight, and reduce the friction. The valve is lifted from its seat by means of a screw upon the valve-rod, to any required distance, so as to regulate the escape of the liquid.

One advantage offered by the use of the above-described apparatus is, that any quantity of gaseous water which may be required for several persons during a meal, may be instantly prepared; and, being of small dimensions, it is portable, and very easily worked. With regard to the degree of saturation of water thus prepared, it may be ascertained by approximation from the following data:—

The upper vessel, in which the saturation is effected, is capable of holding about two pints and a half, and the lower one about a pint. When the apparatus is in operation, the quantity of water which flows on to the powder may be reckoned at about half a pint; the quantity of water to be impregnated with gas may therefore be estimated at about a quart.

Now, in order to operate upon this quantity of water, 18 grammes of bicarbonate of soda are employed, which contain 9¼ grammes or 4½ quarts of carbonic acid. Admitting all the gas produced to be dissolved, the water would contain four volumes and a half of gas, which would be very considerable; but this is not exactly the case.

If a manometer be adapted to the apparatus, for indicating the pressure inside during the operation, it will be observed that, after mixture, and before agitation, the pressure increases rapidly; in five or six minutes it will have attained its maximum degree of pressure, which is, for the above-described proportions, about five atmospheres, when water at 15 degrees is employed; but on stirring, the gas becomes dissolved, and the pressure diminishes and becomes speedily reduced to about two atmospheres and a half, so that the water, in reality, only contains about twice its volume of gas.

Let us see what the quality of ordinary gaseoüs water is in respect of the quantity of gas held in solution.

In the state of perfection to which apparatus for manufacturing gaseous liquids has been brought, water may easily be charged under a pressure of five, six, seven, and even eight atmospheres; or indeed under any pressure if the apparatus were made strong enough. It would, however, be a great mistake to suppose that water thus prepared rapidly by agitation under such great pressure would retain a quantity of gas exactly in proportion to the pressure to which it was submitted during preparation.

The quantity of gas dissolved is always much less than is indicated by the pressure, and at the end of a few days the pressure inside the bottles is seldom above three atmospheres. In all cases when the bottles are uncorked, the water instantly loses the greater part of its carbonic acid, and in a short time only retains the quantity which it is capable of dissolving under the pressure of the atmosphere.

It is however as well to state that the gas is never disengaged so instantaneously, but that with a little practice the water prepared under a pressure of from seven to eight atmospheres may be distinguished from that prepared under a pressure of two or three atmospheres only.

The water prepared by this apparatus is of an agreeable taste, and suitable for general use; it must not be confounded with those purgative solutions which are prepared under the name of *soda water.*

This apparatus may also be used for the preparation of effervescing lemonade, and all kinds of acidulated drinks; and in this respect it is very serviceable in preparing diet drinks, saline solutions, and other medicinal drinks in which the disagreeable taste of the medicine would be in a measure disguised by the carbonic acid, as has been done for a long time with gaseous solutions of sulphate of magnesia (seidlitz water). It now remains to ascertain what danger a person runs when using the apparatus. The following is the result of observations made by us on this head:—

When eighteen grammes of bicarbonate of soda are used as above-mentioned, the pressure does not exceed four and a-half or five atmospheres; this pressure is produced five or six minutes after mixing, but is diminished immediately on agitating it.—Most gaseous waters are prepared and bottled under a much greater pressure than this. Champagne is often under greater pressure.

In order, however, to prevent any accidents which might happen from a crack or flaw, the apparatus is covered with open basket-work; which at the same time that it strengthens, it prevents the glass from flying, in case of its bursting.

What has just been remarked with regard to the pressure in the apparatus relates to proportions of 18 grammes of bicarbonate to 15 of tartaric acid.

The following results have been observed with larger quantities:—

20 grammes of acid . } give a maximum pressure of 6 atmospheres,
24 „ bicarbonate } which is reduced by agitation to 3½ ditto.

30 „ acid . } give a maximum pressure of 7 atmospheres,
36 „ bicarbonate } which is reduced by agitation to 4½ ditto.

45 „ acid . } give a maximum pressure of 9 atmospheres,
54 „ bicarbonate } which is reduced by agitation to 5½ ditto.

This result shews that the pressure obtained is not exactly in proportion to the quantity of ingredients employed, which arises from two causes:—1st. From the increasing pressure offering resistance to the decomposition of the bicarbonate. 2nd. From the proportion of water necessary for dissolving the salt formed remaining always the same,—whatever may be the quantity of salt, the dissolution of the latter becomes more difficult, which forms a fresh obstacle to the decomposition of the bicarbonate.

Notwithstanding these circumstances, which tend to diminish the pressure, the most prudent course will be to employ the proportions of 18 and 15 grammes, in which case there is not the least danger.

OBSERVATIONS ON THE MORE RECENT RESEARCHES IN THE MANUFACTURE OF IRON.—BY DR. J. L. SMITH.

[*From Silliman's Journal.*]

In the last article on this subject,* the operations of the blast furnace alone were alluded to, and among the statements then given, was that of the composition of the gas taken from the mouth of the furnace; which gas contained about 24 per cent. of carbonic oxide, this representing a large portion of the combustible used, which is lost in most of the furnaces now in operation in this country.

M. Ebelman states that the combustion of the gas passing from the mouth of the blast furnace is equal to from $\frac{62}{100}$ to $\frac{67}{100}$ of the calorific effect of the coal used, and MM. Bunsen and Playfair set it down as $\frac{90}{100}$, which last I am inclined to believe is rather too large a fraction; they spoke of the furnace worked with bituminous coal, and Ebelman had allusion to one worked with charcoal. Without being able to decide exactly what portion of the combustible of the blast furnace is lost, it is sufficient to know that it is far greater than that consumed, to lead at once to the employment of means bringing into use this waste combustible.

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* See Vol. XXVIII., p. 204.

The employment of the heat lost from the mouth of the blast furnace, for the purposes of metallurgy, &c., has been claimed by many as having been used by them since 1834. The following are some of the claimants:—MM. Thomas and Laures (civil engineers); MM. d'Andelarre and de Lisa (forge masters at Treveray); M. le Maréchal Marmont (in Austria); M. Houzeau Muiren (of Ardennes); and M. de Faber Dufaur (of Wasseralfingen). All their claims of priority, however, ought to be laid aside, since the operation was performed many years prior to the time that any of them claim to have first employed the lost heat. And as a proof of this assertion, I give the following extract from the Journal des Mines, Juin, 1814.—"M. Aubertot of the department of Cher, and owner of furnaces and other works, in excellent condition and management, which he superintends personally, made, several years ago, a great many experiments to discover some means of economizing the amount of fuel used in the working of iron, either by endeavouring to introduce the operation by the catalan furnace, or otherwise. He was led to try what could be accomplished by making use of the flame which passed out of the blast and refining furnace. He first employed it for the cementation of steel, in which he succeeded perfectly; then he used it for calcining lime, also for burning bricks and tiles. Afterwards he passed it into a reverberatory furnace, in which the temperature was raised sufficiently to heat the blooms and bars, for hammering the one and drawing the other out. Finally he succeeded in producing all the above effects at one and the same time, by causing the flame to circulate through several furnaces side by side."

In 1834, M. Houzeau Muiren took out a patent for using the waste heat from the mouth of the blast furnace for carbonizing wood at the furnace of Bievres (Ardennes); in which he states that twice the quantity of charcoal is obtained by treating the wood after his method, than by the ordinary way of burning in the woods. By the heat lost from the furnace, 100 parts of wood gave 35 of charcoal, and from 40 to 45 of *charcoal roux* (half burnt wood).

But, after all, it is not to those who first applied this lost heat to economical purposes that we are indebted for the practical information that is now in our possession; for had they made their arrangements so as to exhibit an undisputed advantage arising out of its adoption, it would not have been so tardy in its progress.

It is to M. de Faber Dufaur, superintendent of the iron works at Wasseralfingen, in the kingdom of Wurtemburg, that most of the credit is due for the present method of converting pig into wrought iron, by using and burning the gases that escape from the mouth of the blast furnace. The best idea that can be given of the manner in which the operations are conducted in the above works, and the advantages accruing therefrom, is contained in the following short extract from a letter written by M. Grouvelle to M. Dumas.

"The establishment at Wasseralfingen is supplied with ore, three-fouths of which is a hydrated oxide of iron, and the other fourth is an ore in grains. The influence of the first species of ore gave to the pig so bad a quality that it was used altogether for castings. M. Dufaur, by his processes, without altering the operations of the blast furnace, now obtains from the pig a wrought iron of superior quality.

"The first gas furnace put in operation by him was a refining furnace, into which the pig metal was run as it issued from the blast furnace, where the refining was executed with the air of the hot blast. From this the most beautiful results were obtained, and it worked regularly during the year 1837. In 1838 he erected a puddling furnace; and finally in 1839 he completed his magnificent system for the fabrication of iron, by constructing a furnace for re-heating and welding."

At Wasseralfingen there are now turned out annually, one million pounds of wrought iron in various forms, made in these new furnaces, and owing to the deficiency of moving power, all the pig cannot be worked up. This operation of refining iron by the combustion of gas, without any other fuel, has been in successful operation at the above locality for several years, and it has been followed with a great improvement in the quality of the iron, and has reduced the loss to one fourth of what it was originally.

This method of refining the pig has also been in active operation in a number of places, and whenever properly executed, is always attended with economy and success. M. d'Andelarre, in one of the departments of France, in a letter states, " our puddling furnaces, heated altogether by the gas lost from the mouth of the blast furnace, has been attended with the most complete success, which rarely happens in the first attempts at the application of any improvement, which most generally require long experience. We lighted up our furnace on the morning of the 5th, and put in the first charge at 11 o'clock on the morning of the 6th, and shingled the same at three-quarters past 12. The accomplishments of the results so quickly passed our expectations, resulting in—

" 1st. An economy of the total amount of fuel used in the refining of iron (which, in a furnace with two doors, amounted, in twenty-four hours, to 6,000 pounds bituminous coal, costing, twelve dollars).

"2d. Improvement in the quality of the iron.

" 3d. The loss was very small, being 5 instead of 20 per cent., which it is by the old processes.

"4th. The operations of the furnaces are much improved."

Here we see that the experience of M. d'Andelarre accords exactly with that of M. Dufaur, and already have Russia, Prussia, Sweden, and Germany, sent commissioners to Wasseralfingen, to study the processes as they are there carried on. The government of Wurtemburg have opened their works to the inspection of all who may wish to make themselves acquainted with their character.

The advantages arising from the employment of the waste gas from the mouth of the blast furnace is no longer problematical, and as some of those interested in this matter may not be acquainted with the method by which the gas is collected and employed, a few words explanatory of it will not be out of place.

The gas, as it rises through the fire room of the furnace, containing from 60 to 80 per cent. of the combustible effect of the fuel used, is made to pass into a chamber surrounding the upper and outer part of the fire room. Into this chamber the gas is conducted by pipes from the fire room, and other pipes are provided for drawing off the gas from the chamber. The gas is drawn out by means of blowing cylinders, and forced into the refining, puddling, or other furnace, through a number of small orifices, alternating, with other orifices, through which a cold or hot blast of air is thrown, that serves to keep up the combustion of the gas when once united; and by regulating the supply of air, by means of stop-cocks, the maximum of heat can be obtained. In order to arrive at the maximum of heat, just sufficient air should be admitted to burn all the carbonic oxide and hydrogen contained in the gas coming from the blast furnace. If the amount of air be too small, some of the combustible gases pass out unconsumed; if too great, the excess cools the furnace, and at the same time oxidizes the metals undergoing refining. The regulation of the supply of the blast is of the utmost importance, and is said to be easy of accomplishment.

The differences between the reverberating furnaces worked in this way and those in which coal is used is, that carbonic oxide with a little hydrogen is the fuel, and it is burnt by a full supply of air. It is hardly necessary to say more of the advantages that are to arise out of this important change in the working of iron; for there is no expense for fuel in the refining of the pig, as the gaseous combustible issuing from the mouth of the blast furnace is more than sufficient to refine all the pig made from the furnace. The quality of iron is also improved, as none of those impurities contained in the coal and other fuel can interfere in the working of the iron.

The sooner these modifications are introduced into our furnaces, the sooner will we be able to place iron in the market at a price to compete with that coming from any other quarter of the world, and entering our ports free of duty; at the same time it will increase the value of those works whose wood-land has been diminished by a too rapid and improvident use of fuel.

I next pass on to make a few remarks about the *refining furnace* used in the working of iron. In these furnaces the air is thrown, by one or two tuyers, into a crucible filled with charcoal, into which the pig to be refined, along with scraps coming from previous operations, is placed in a certain relative position. The changes that take place by the reaction of the air upon the coal, is similar to what occurs in the lower part of the blast furnace, namely, the conversion of the oxygen into carbonic acid, which is immediately changed into carbonic oxide. The analyses of the gases taken from the centre of the furnace, prove that the transformation of the oxygen into carbonic acid corresponds to the position where the workmen constantly place the iron that is about to be forged, and this is just what we should expect, as it is the point of maximum temperature.

Ebelman states that the atmosphere which surrounds the melted iron contains hardly a trace of carbonic acid, either in the blast or puddling furnace; this being contrary to the opinion which is generally admitted, that the decarbonization of the iron takes place by the action of the air during the melting of the pig; but it would appear that this reaction is attributable to the protoxide of iron covering the surface of the mass undergoing refining. In the second period of refining, in the puddling, properly speaking, it is easy to deduce from the analyses of the gas that there is oxidation of a considerable portion of the iron by the oxygen of the air thrown in at the tuyer.

Here again much of the fuel passes off under the form of carbonic oxide, thereby causing considerable waste. Of late years a modification has been introduced into the refining furnaces, even when the waste gases from the blast furnace are not employed; a modification by which none of the combustible is lost. A few words will suffice to explain how this is accomplished.

All the furnaces are modifications of the reverberatory furnace. The fuel is placed upon the grate and ignited by air thrown in from below the grate, by a bellows or otherwise. The air, in traversing the ignited coal, is first converted into carbonic acid, and then, if the bed of coal be thick enough, this last will be changed into carbonic oxide. As this, however, is generally not the case, a part of the carbonic acid passes beyond the upper surface of the fuel without having undergone a change, particularly if the blast from below has been strong and abundant. By this operation the chamber or bed of the furnace becomes heated, and a mixture of carbonic acid, carbonic oxide, nitrogen, and a little hydrogen is passed out at the flue. The object of the metallurgist, however, is not to permit any carbonic oxide or hydrogen to escape combustion, but to endeavour to add to the heat of the furnace that heat arising from the combustion of these two gases. This is readily accomplished by throwing in a second blast of air, through a number of small orifices just above the surface of the fuel: this blast to be regulated as required.

By this process we re-create, as it were, the maximum intensity of heat (which first shews itself at the lower part of the fuel on the grate, just where the air becomes converted into carbonic acid), and in the chamber where it is most wanted; for the amount of heat rendered latent by the reduction of the carbonic acid into carbonic oxide, is rendered sensible by the reproduction of the former.

The advantages arising from this method of burning the fuel, are important. In the first place the heat is diffused over a larger space, thereby heating more uniformly the metal than when it is placed in the midst of the fuel. Again, fuel of the most inferior quality can be made use of, and as evidence of this, in some trials made at Audincourt, it was proved that the reverberatory furnace could be heated to whiteness by burning the gas, and the pig melted and puddled, when a mixture of charcoal-dust and earthy matter was made use of as fuel.

Ebelman, whom I have so often quoted in these articles, and who has certainly made the best series of scientific researches upon the subject, says, that instead of employing the action of air upon an excess of charcoal to produce the combustible gas, the vapour of water may to an extent be substituted, which produces in contact with burning charcoal, carbonic oxide and hydrogen.

The heat of the combustion of equal *volumes* of hydrogen and carbonic oxide is about the same, and it can be easily deduced that the decomposition of the vapor of water by the charcoal, determines an absoption of latent heat, equal to that which is produced by the transformation of the same volume of carbonic acid into carbonic oxide. The vapor of water alone passed through the ignited coal produces all the effects just mentioned, but the absorption of latent caloric is so great as to cause the operation to cease in a few minutes. By projecting, however, a mixture of air and the vapor of water through the coal, the operation is said to be carried on advantageously.

It was my intention to have remarked, at length, about the effects of the hot blast, but it is now so generally admitted that the hot is to be preferred to the cold blast in reducing the iron from the ore, and bringing it to its most refined state, that anything on the subject at this time would be superfluous. All that is important to make known upon this subject is the results lately arrived at by M. Scheerer, as to how it is that hot air produces such remarkable effects in the blast furnace.

By calculations, based upon his own experiments as well as those of others, he was led to the conclusion, that the most elevated temperature that charcoal could produce in burning in air, is 2571° Cent., which is that at which platinum melts. This temperature is situated in the middle of the space upon which the air is projected, and it goes on diminishing towards the exterior, so as to form a space for melting, the centre of which is at 2571° and the exterior at 1550° Cent. When the hot blast is made use of, the temperature of the centre does not change, but the portion heated to 2571° becomes more extended. The exterior of the mass which was at 1550° while using the cold air, acquires when the hot blast is employed, a temperature as many degrees higher as there is difference between the temperature of the two blasts; for instance, if the temperature of the air be 280° C., that of the exterior of the heated mass will be 1830° C. —if 300° C., the latter will be 1850° C.

Thus the influence that hot air exercises, is to extend the space of fusion, which is twice as great with the air at 300° C. as it is when the air is at 0° C.

REPORT OF AMERICAN PATENTS.

BY MR. C. M. KELLER.

From the "Journal of the Franklin Institute."

To ARNOLD HOSMER, *of Bath, Summit county, Ohio, for an improvement in the method of hanging carriage bodies.*

ON each axle there is an arch piece, to the upper part of which two other arch pieces are suspended, and on these latter the carriage body is placed, with springs interposed, so that the carriage body is free to swing; and the perch being made with a swivel, the wheels can pass over irregularities in the road without tilting the carriage body, as in the mode now practised.

Claim:—"What I claim as my invention, and desire to secure by letters patent, is the combination of the three following particulars:—1, the suspension of the carriage body or box upon vibrating arches; 2, the pin, or guides, and its appendage, the semi-circular hoop; and 3, the swivel in the perch, all of which as herein described."

To WILLIAM LILLIE, *of Edwards, St. Lawrence county, New York, for a double-acting bellows.*

THE different compartments of this double-acting bellows are connected by means of a flexible tube, and the valves are arranged to correspond with this change.

Claim:—"What I claim as my invention, and desire to secure by letters patent, is the manner in which I have combined the apartments of the bellows by means of a flexible tube, and the arrangement of the apertures and valves, as set forth."

To JOSEPH RIDER, *of Wooster, Wayne county, Ohio, for a mode of making adjustable patterns for cutting boots.*

THE leg part of the pattern is made of two pieces connected together by means of two slots and pins, to admit of adjustment for different sizes; and to these are attached by slides, toe, heel and foot pieces—all provided with scales to regulate the various sizes required.

Claim:—"Having thus fully described my improvements in boot patterns, what I claim as my invention, and desire to secure by letters patent, is combining the plates in the manner described by means of the curved slot and straight slot, arranged in the manner and for the purpose set forth.

"I also claim the combination of the draft piece with the slide, in the manner herein specified.

"I also claim, in combination with the front pattern, the separate pieces for measuring the toe and instep as set forth; and lastly, I claim the combination of the index or the toe piece, for the purpose above specified."

To WILLIAM C. GRIMES, *of Philadelphia, Pennsylvania, for a spark arrester.*

THE patentee says:—"The nature and principle of my invention consists in giving to the upper part of the chimney of a locomotive or other steam-engine, such a form as to cause the gaseous current as it passes through the same, to circulate or revolve around a horizontal, cylindrical screen; tending by this circular or rotary motion to throw all the sparks or other solid particles from the central screen outwards to the walls of the circular or scroll-formed chamber, from whence, through proper openings, they escape into an exterior receptacle prepared for the purpose, while the gases readily pass into the central screen, and thence escape at the open ends of it into the atmosphere direct, or through short vertical side-flues constructed for the purpose."

Claim:—"What I claim as new, and as constituting my invention, and desire to secure by letters patent, is the giving to the gaseous current a rotary motion around a cylindrical or other formed screen, by giving to the upper part of the chimney a curved, coiled, or convoluted form around the screen, substantially in the manner as herein-before shewn and set forth."

To ERASTUS W. ELLSWORTH, *East Windsor, Hartford county, Connecticut, for an improved instrument for drawing.*

THE patentee says:—"My invention consists in a mechanical arrangement which so combines an index in the focus of the eyeglass of a telescope with a pencil, crayon, blunt point, or other marking implement, that when said index is apparently made to pass over the outlines of any object, the said pencil, crayon, blunt point, or other marking implement, shall trace the outlines of said object."

Claim:—"What I claim as my invention, and desire to secure by letters patent, consists in a mechanical arrangement which so combines an index constructed of cross-hairs or spider-web lines intersecting each other at right angles, or a dot on a plane lens, or any other similar contrivance, placed in the focus of the eyeglass of a telescope, with a pencil, crayon, blunt point, or other marking implement, that when said index is apparently made to pass over the outlines of any object, seen through the telescope, the said pencil, crayon, blunt point, or other marking implement, shall trace said outlines as herein described."

To THEODORE TIMBY, *of Cato-four-corners, Cayuga county, New York, for an improvement in the re-action water-wheel.*

THE patentee says:—"The nature of my invention, and the chief characteristics which distinguish it from all other water-wheels before known, consist in continuing the hollow arms, through which the water passes, and from which it issues, in a curve excentric to the curve of that part of the arms which receives the water, and which is concentric with the shaft, as fully stated in my letters patent referred to above; the inner and outer peripheries of the excentric part of the arms being parallel with each other, instead of approaching to each other for the purpose of gradually contracting the channel in the arms towards the issues, as heretofore; this end being attained in my present improvement, by means of a jointed or hinged shutter or valve, regulated by a screw, or other analogous device, by which the channel is not only gradually contracted, but is susceptible of the nicest adjustment, and at the same time affords the means of removing blocks of wood and other obstructions, which frequently enter the channels and are wedged in with great force by the pressure of the water, but which in my wheel may be removed with facility, by simply opening the shutter or valve."

Claim:—"Having specified the characteristics of this wheel, and the manner of constructing the same, I wish it to be distinctly understood, that I do not claim as my invention the form of the concentric part of the channels or water passages in the arms, nor simply making the arms excentric, nor the employment of regulating valves at the issues of the channels, as these, separately, are well known; but what I do claim as my invention, and desire to secure by letters patent, is combining with the concentric the excentric continuation of the channels, for the purpose and in the manner substantially as herein described; and I also claim the employment of the hinged adjustable valves or shutters, which regulate and gradually reduce the capacity of the issues, and afford the ready means of removing obstructions from the channels or water passages, in combination with arms having channels or water passages of equal capacity from end to end, as herein set forth."

To DAVID BRUCE, jun., *of Williamsburgh, Long Island county, New York, for a machine for casting printing types.*

THE patentee says:—"In the construction of this machine I have endeavoured, as near as possible, to imitate, by mechanical means, the process of casting types as usually performed by hand. With this view I have placed the mould on what I shall denominate the *crane*, at an inclination of about fifty degrees from the perpendicular, to give greater freedom to the discharge of the type; and, as in the process of hand-casting, the lifting of the matrix precedes that of the opening of the mould."

We are under the necessity of omitting the claims, as they could not be understood without the drawings, which are too complex and numerous for publication; the object and general character are clearly indicated above.

To William Wright, *of Providence, Rhode Island, for a machine for boring out the cylinders of rotary steam engines.*

The patentee says:—"The nature of my invention consists in arranging a cutter which, as it rotates with the shaft to cut out the annular groove, receives a slow rotary motion on the arm or flanch which connects it with the shaft, to make the groove a true circle in its cross section."

Claim:—"I therefore claim as my invention the giving to the cutter a rotary feed motion on its axis as it is carried around by the main shaft as herein described, or in any manner substantially the same."

To Charles Babcock, *East Haddam, Middlesex county, Connecticut, for an improvement in the stove for heating apartments.*

The patentee says:—"The fire chamber of my stove consists of a cylinder of iron, the two ends of which contain hinged grates, or grate bars, upon either of which the fuel is to rest, the two ends being alike. Between the two ends the cylinder may be lined with a bad conductor of heat, if desired. The grate bars are made to raise, so that the set which is uppermost may be opened for the supply of fuel. This cylindrical fire chamber is to be furnished with two gudgeons opposite to each other, and at equal distances from its ends; upon these gudgeons it is to be sustained when in use. I place this cylinder within a vertical drum of such depth from head to head as slightly to exceed the diameter of the cylinder, and of such diameter as will allow the cylinder to revolve within it without touching its periphery. Upon one of the gudgeons on the outside of the drum, I affix a winch, or crank handle, by means of which the cylinder may be inverted or agitated at pleasure. On the top of the drum I place a box or case, on one side of which there is to be a door for the admission of fuel; and either from the top, or from one side of this box or case, proceeds a pipe for the exit of smoke and gaseous matter."

Claim:—"Having thus fully described the manner in which I construct my stove, what I claim therein as new, and desire to secure by letters patent, is the combining of a cylindrical stove, furnished with a grate at each of its ends, with a drum within which it may be inverted, in the manner and for the purpose set forth; the respective parts being constructed and arranged substantially as described."

To Theophilus Smith, *of Galway, Saratoga county, New York, for an improvement in the cooking stove.*

This stove has two ovens, one at back of the fire chamber, and the other below the fire chamber and the first oven; and between the back plate of the fire chamber and the front plate of the first oven, there is a partition to divide the space into two flues. The draught passes from the fire-place down in front of the division plate, over the forward half of the lower oven, down the front thereof under it, up the back end, over the back half, and under the first oven,—then up between the front of the first or upper oven and the partition, and finally over this oven to the chimney.

Claim:—"What I claim as my invention, and which I desire to secure by letters patent, is the combination of the arrangement of the flues with the division plate, as set forth."

LIST OF REGISTRATIONS EFFECTED UNDER THE ACT FOR PROTECTING NEW AND ORIGINAL DESIGNS FOR ARTICLES OF UTILITY.

1846.

July 30. *William Massingham*, of Heacham, near Lynn, Norfolk, for a folding garden chair.

August 6. *William Wilson*, of 15, St. Martin's-le-Grand, tailor, for the royal equestrian cape or cloak.

7. *Angell & Sons*, of 51, Compton-street, Clerkenwell, Middlesex, for a non-conducting fastening for attaching handles to various useful articles, such as teapots, dish-covers, &c.

7. *Thomas Lees*, of Stockport, engineer, for a double-action safety-valve for steam-boilers.

8. *John Talbot Ashenhurst*, of 41, Upper John-street, Fitzroy-square, cabinet and piano-forte maker, for an improved bolt for mortice and other locks.

8. *Thomas Pugh*, of 66, Great Queen-street, Lincoln's Inn, London, and 288, Bradford-street, Birmingham, for a hame for a horse collar.

8. *Samuel John Deeble*, of Potten, Bedfordshire, for a bottom of a kettle or saucepan.

11. *Ulric Debaune*, of 4, Wellington-street, Strand, for a receiver for millstones.

August 12. *P. Phillips & Myers*, of Birmingham, for an improved letter clip.

13. *John Paterson*, of 104, Wood-street, Cheapside, for a brace.

13. *Fox & Carson*, of Liverpool, for a jack for putting on and pulling off boots.

13. *P. Phillips & Myers*, of Birmingham, for a penholder.

13. *Gabriel Riddle*, of 172, Blackfriars-road, London, for a self-closing stopper for bottles, decanters, &c., peculiarly adapted for wines, spirits, and volatile fluids or substances.

14. *William Oatley, Sen., and William Oatley, Jun.*, of 25, Aldermanbury, London, plumbers, &c., for a self-acting ventilator.

14. *William Blenkiron*, of Wood-street, Cheapside, for an improved shirt collar.

18. *Samuel Harris*, of 52, Stanhope-street, Clare-market, London, for a bracket.

18. *Richard Bright*, of Bruton-street, lamp-manufacturer, for a candle-lamp fender nozzle.

18. *James M'Donald*, of Hotham-street, Liverpool, superintendant of the Liverpool and Harrington Works, for a sliding valve cock.

18. *Mortiboy & Herbert*, of 8, Newman-street, Oxford-street, for a fastener for the pins of brooches.

19. *James Quantrille*, of 3, Fellows-street North, Kingsland-road, for a spring back for waistcoats and trowsers.

20. *James Pullin*, of 1, Nelson-place, Clifton, for folding ribs for umbrellas and parasols.

21. *Daniel Bax*, of 48, Regent-street, St. James's, tailor, for a great coat.

22. *William Lewis Turner*, of 25, Cambridge-street, Connaught-square, for a newspaper envelope.

22. *Jasper Wheeler Rogers*, of No. 1, Nottingham-street, Dublin, civil engineer, for a portable or stationary kiln.

27. *James Fougere*, of Conduit-street, Middlesex, for a new shape for coats, surtouts, and other body garments.

27. *Ann Milner*, of Sheffield, for a ventilating fender.

List of Patents

That have passed the Great Seal of IRELAND, from the 21st July to 21st August, inclusive.

To Charles Hancock, of Grosvenor-place, in the county of Middlesex, Gent., for certain improvements in the manufacture of gutta-percha, and its applications alone and in combination with other substances.—Sealed 14th July.

George Lowe, formerly of Brick-lane, Old-street, in the county of Middlesex, but now of Finsbury-circus, in the said county, civil engineer (extension of original invention), for an invention for increasing the illuminating power of such coal-gas as is usually produced in gas works; also for converting the refuse products from the manufacture of coal-gas into an article of commerce not heretofore produced therefrom; and also of a new mode of conducting the process of condensation in the manufacture of gas for illumination.—Sealed 14th July.

John Brocklehurst, of Holborn, in the county of Middlesex, lamp manufacturer, for certain improvements in the hanging and disconnecting of window-sashes and frames.—Sealed 11th August.

List of Patents

Granted for SCOTLAND, subsequent to July 22nd, 1846.

To Henry Highton, of Rugby, Master of Arts, for improvements in electric telegraphs.—Sealed 23rd July.

William Seed, of Preston, machine-maker, for certain improvements in machinery or apparatus for preparing, slubbing, and roving cotton and other fibrous materials.—Sealed 23rd July.

Robert Hodgson, of Neckenger-road, Bermondsey, London, for certain improvements in propelling vessels, and in the machinery for working the same.—Sealed 28th July.

Augustus William Hillary, of 66, Cadogan-place, Chelsea, but at present residing at 146, Avenue des Champs Elysees, Paris, for improvements in the manufacture of gas.—Sealed 29th July.

Lawrence Hill, jun., of Glasgow, civil and mechanical engineer, for improvements in the manufacture of iron for building ships, and boats, and other vessels, and in instruments, machinery, and apparatus to be used in the said construction,—being a foreign communication from Henry Burden, of Troy, in the

United States of America, and partly by invention of his own. —Sealed 29th July.

Hugh Greaves, of Hulme, Manchester, engineer, for improvements in the construction of railways, and in the vehicles to be used thereon.—Sealed 3rd August.

David Yoolow Stewart, of Montrose, Scotland, iron-founder, for improvements in moulding iron or brass.—Sealed 5th August.

John Augustin Alexis Sauvage, of Rue Richlieu, Paris, mechanist, for improvements in condensing the steam of steam-engines, and in supplying water to steam-engine boilers.—Sealed 5th August.

Christopher Binks, of Friars Goose House, Durham, chemist, for improvements in the manufacture and in the application to useful purposes of certain compounds of nitrogen and of carbon, more particularly cyanogen, ammonia, and their compounds. —Sealed 6th August.

John Simson, of Riches-court, Lime-street, London, merchant, for certain improvements in machinery for preparing and spinning flax and other fibrous materials,—being a foreign communication.—Sealed 10th August.

John Brocklehurst, of Holborn, London, lamp manufacturer, for certain improvements in the hanging and disconnecting of window-sashes and frames.—Sealed 10th August.

Robert Robinson, of Strines, in the county of Derby, calico printer, and Thomas Bowden, of the same place, mechanic, for certain improvements in machinery for washing and cleaning cotton, linen, or woollen fabrics.—Sealed 13th August.

Robert William Thomson, of Adam-street, Adelphi, London, civil engineer, for an improvement in carriage-wheels, which is also applicable to other rolling bodies.—Sealed 13th August.

Extension of a patent granted to Richard Whytock, of Edinburgh, manufacturer, for the term of five years, (the original patent granted on 21st September, 1832,) for an improved method or manufacture which facilitates the production of regular figures or patterns on different fabrics, particularly velvet pile, and Brussels, Wilton, and Turkey carpets, with a saving of material. —Sealed 17th August.

Peter Claussen, of Leicester-square, London, for certain improvements in machinery for weaving.—Sealed 18th August.

James Montgomery, of Salisbury-street, London, engineer, for certain improvements in the construction of steam-boilers and steam-engines, and in steam-vessels, and the machinery for propelling the same.—Sealed 18th August.

New Patents

SEALED IN ENGLAND.

1846.

To Robert Heath, of Manchester, Gent., for certain improvements in wheels to be used upon rail and other roads, which improvements are also applicable to mill-gearing and other similar purposes. Sealed 27th July—6 months for inrolment.

John Augustin Alexis Sauvage, of Rue Richlieu, Paris, mechanist, for improvements in condensing the steam of steam-engines, and in supplying water to steam-engine boilers. Sealed 27th July—6 months for inrolment.

Thomas Lucas, of No. 113, Aldersgate-street, City, lozenge manufacturer, for certain improvements in the manufacture of lozenges or sweetmeats. Sealed 29th July—6 months for inrolment.

Henry Bessemer, of Baxter House, Old Saint Pancras-road, engineer, for certain improvements in the manufacture of glass, and in machinery and apparatus connected therewith; and also in silvering or coating glass; parts of which improvements are applicable to the manufacture of tinfoil and thin sheets of other metal or alloys of metal. Sealed 30th July—6 months for inrolment.

Robert Mallett, of the city of Dublin, engineer, and John Somers Dawson, of the city of Dublin, coach-builder, for certain improvements in railway carriages, and in the machinery for working railways, parts of which are applicable to other carriages and to the bearings of other machinery. Sealed 30th July—6 months for inrolment.

William George Armstrong, of Newcastle-upon-Tyne, for an improved lifting, lowering, and hauling apparatus. Sealed 31st July—6 months for inrolment.

Theophile Auguste Dreschke, of Rue Therese, Paris, late an officer of artillery in the service of Prussia, and late professor of sacred music at the University of Berlin, for improvements in the keys of pianofortes and other keyed musical instruments. Sealed 31st July—6 months for inrolment.

John Bayley, of Heaton Norris, near Stockport, in the county of Lancaster, manager, for certain improvements in machinery or apparatus for spinning or twisting cotton and other fibrous substances. Sealed 1st August—6 months for inrolment.

Thomas Payne, of Handsworth, near Birmingham, Gent., for improvements in the manufacture of rolls for rolling iron and other metals. Sealed 4th August—6 months for inrolment.

Charles Vignoles, jun., of Apperby Bridge, near Bradford, in the county of York, civil engineer, for improvements in employing steam as a motive power. Sealed 4th August—6 months for inrolment.

George Lodge, of Leeds, engineer, for certain improvements in heating water, generating steam, and saving fuel. Sealed 10th August—6 months for inrolment.

François Teychenné, of Redcross-square, Cripplegate, feather merchant, for improvements in treating stone to render it hard and impermeable, and in coloring the same,—being partly a communication. Sealed 10th August—6 months for inrolment.

Frank Hills, of Deptford, manufacturing chemist, for a method or methods of treating certain gases, and manufacturing sulphuric acid, muriatic acid, acetic acid, and certain salts of potash, soda, and ammonia. Sealed 11th August—6 months for inrolment.

William Kayser, of Bread-street, Cheapside, Gent., for improvements in the manufacture of looking-glass,—being a communication. Sealed 11th August—6 months for inrolment.

Richard Whytock, of Edinburgh, manufacturer, for an improved method or manufacture which facilitates the production of regular figures or patterns on different fabrics, particularly velvets, velvet pile, and Brussels, Wilton, and Turkey carpets; being an extension for the term of five years, to be computed from the 8th day of September, 1846, of letters patent for the said invention, granted by his late Majesty King William the Fourth, dated the 8th September, in the third year of his reign. Sealed 11th August.

Charles Dowse, of Camden Town, in the county of Middlesex, Gent., for improvements in the manufacture and finishing of fabrics capable of being used as substitutes for paper. Sealed 11th August—6 months for inrolment.

William Warcup, of Ashton-terrace, Coronation-road, Bristol, civil engineer, for certain improvements in the manufacture and arrangement of parts and apparatus for the construction and working of atmospheric railways. Sealed 11th August—6 months for inrolment.

Henry Constantine Jennings, of Cumberland-terrace, Regent's-park, Middlesex, practical chemist, for a new method or apparatus, or machine, for the better or more economic evaporation of fluids or liquids containing crystalline or other matters to be concentrated or crystallized. Sealed 11th August—6 months for inrolment.

Charles Iles, of Bordesley, Birmingham, Gent., for machinery and apparatus for making certain descriptions of dress fastenings, which machinery and apparatus, or parts of which machinery and apparatus, are applicable to other useful purposes. Sealed 11th August—6 months for inrolment.

Jean Michel Borgognon, of 15, New Broad-street, in the city of London, for certain improvements in producing artificial basaltic lavas,—being a communication. Sealed 11th August—6 months for inrolment.

Daniel Sydney Hasluck, of Birmingham, merchant, for certain improvements in the manufacture of harness for beasts of burden,—being a communication. Sealed 13th August—6 months for inrolment.

John Buchanan, of Queen's-square, Westminster, Gent., for certain improvements in ships or vessels, and in propelling thereof, and in securing the same from floatal damage; certain parts of which machinery may be used for motion on land. Sealed 15th August—6 months for inrolment.

William Aitken, of Aberdeen, in North Britain, Gent., for certain improvements in two and four-wheel carriages. Sealed 15th August—6 months for inrolment.

George Phillips, of Park-street, Islington, chemist, for an improved construction and arrangement of apparatus for supporting garden pots and improving the growth of plants. Sealed 17th August—6 months for inrolment.

Moses Poole, of the Bill Office, Gent., for improvements in manufacturing Terry and cut piled fabrics,—being a communication. Sealed 17th August—6 months for inrolment.

Joseph Gray, of Redcross-street, Southwark, machinist, for improvements in gas-meters. Sealed 17th August—6 months for inrolment.

George Remington, of Park-street, Westminster, engineer, for certain improvements in locomotive engines, part of which improvements are applicable to marine and stationary engines. Sealed 17th August—6 months for inrolment.

Joseph Clinton Robertson, of Fleet-street, in the city of London, civil engineer, for an improved method of constructing boats, ships, and vessels of wood,—being a communication. Sealed 17th August—6 months for inrolment.

George Hinton Bovill, of Millwall, in the county of Middlesex, engineer, for improvements in manufacturing wheat and other grain into meal and flour,—being a communication. Sealed 18th August—6 months for inrolment.

Samuel Haven Hamilton, of Paris, Gent., for improvements in machinery or apparatus for dredging or excavating,—being a communication. Sealed 19th August—6 months for inrolment.

William Crofts, of the Park, Nottingham, lace manufacturer, for improvements in the manufacture of lace and other fabrics. Sealed 20th August—6 months for inrolment.

Henry Parry, of High-street, Deptford, Gent., for certain improvements in the manufacture of hats. Sealed 20th August —6 months for inrolment.

Matthew Gibson, of Wellington-street, Newcastle-upon-Tyne, machine maker, for a machine for reaping, cutting grass, and other similar purposes. Sealed 22nd August—6 months for inrolment.

Maximilian François Joseph Delfosse, of Paris, but now of Regent-street, Esq., for improvements in preventing and removing incrustation in steam-boilers. Sealed 25th August— 6 months for inrolment.

James Bishop, of Piccadilly, warehouseman, and Thomas Wood, of Upper Barnsbury-street, Islington, Gent., for improvements in passengers' carriages. Sealed 25th August—6 months for inrolment.

Thomas Russell Crampton, of Adam-street, Adelphi, engineer, for improvements in locomotive engines. Sealed 25th August —6 months for inrolment.

Alexander Parkes, of Birmingham, artist, for improvements in the manufacture of candles, and in preparing and combining certain animal, vegetable, and mineral substances, applicable to the manufacture of candles and other uses. Sealed 25th August—6 months for inrolment.

James Murdoch, of Staple Inn, Middlesex, for a process for making a composition or artificial stone, applicable to building and other useful purposes. Sealed 25th August—6 months for inrolment.

CELESTIAL PHENOMENA FOR SEPTEMBER, 1846.

D.	H.	M.	
1			Clock before the ☉ 0m. 4s.
			☽ rises 3h. 56m. A.
			☽ sets 8h. 28m. A.
			☽ passes mer. Morn.
	—		Occul. *ρ*1 Sagittarii, im. 9h. 18m. em. 10h. 24m.
3	4	48	☿ stationary
4	3	15	♄ in conj. with ☽ diff. of dec. 6. 28. S.
	11		☽ in Perigee
5			Clock before the sun, 1m. 41s.
	—		☽ rises 6h. 48m. A.
	—		☽ passes mer. 0h. 18m. M.
	—		☽ sets 6h. 29m. M.
	1	16	Ecliptic oppo. or ○ full moon.
6	16	49	♃'s first sat. will im.
7	4	6	♅ in conj. with the ☽ diff. of dec. 2. 11. S.
8	1	42	♃ □ ☉
	11	17	♃'s first sat. will im.
	12	11	♃'s second sat. will im.
	14	45	♃'s second sat. will em.
9	5	8	☿ in the ascending node
	21	6	♂ in conj. with the ☉
10			Clock after the sun, 3m. 3s.
	—		☽ rises 9h. 0m. A.
	—		☽ passes mer. 3h. 54m. M.
	—		☽ sets 11h. 35m. M.
	—		Occul. A.S.C. 454, im. 12h. 34m. em. 13h. 33m.
	11	42	♃'s third sat. will em.
	20	30	☿ greatest elong. 17. 55. W.
11	16	23	♃ in conj. with the ☽ diff. of dec. 3. 1. N.
	—		Occul. *m* Tauri, im. 15h. 12m. em. 16h. 28m.
12	6		Pallas in conj. with ♅ diff. of dec. 10. 6. S.
	11	42	☽ in □ or last quarter
13	11	13	♀ in conj. with Vesta, diff. of dec. 2. 2. N
	18	41	☿ in Perihelion
14			Mercury R. A. 10h. 24m. dec. 11. 3. N.
	—		Venus R. A. 10h. 2m. dec. 13. 5. N.
	—		Mars R. A. 11h. 24m. dec. 4. 55. N.
	—		Vesta R. A. 10h. 1m. dec 15. 16. N.
	—		Juno R. A. 15h. 6m. dec. 6. 19. S.
14			Pallas R. A. 0h. 48m. dec. 6. 0. S.
	—		Ceres R. A. 4h. 12m. dec. 13. 13. N.
	—		Jupiter R. A. 4h. 59m. dec. 21. 56. N.
	—		Saturn R. A. 21h. 54m. dec. 14. 29. S.
	—		Georg. R. A. 0h. 49m. dec. 4. 31. N.
	—		Mercury passes mer. 22h. 53m.
	—		Venus passes mer. 22h. 31m.
	—		Mars passes mer. 23h. 50m.
	—		Jupiter passes mer. 17h. 24m.
	—		Saturn passes mer. 10h. 19m.
	—		Georg. passes mer. 13. 14.
15			Clock after the sun, 4m. 47s.
	—		☽ rises 0h. 23m. M.
	—		☽ passes mer. 8h. 4m. M.
	—		☽ sets 3h. 38m. A.
	13	11	♃'s first sat. will im.
	14	48	♃'s second sat. will im.
17	3	0	☽ in Apogee
17	13	30	♃'s third sat. will im.
	15	42	♃'s third sat. will em.
18	7	49	♀ in conj. with the ☽ diff. of dec. 6. 41. N.
19	0	21	☿ in conj. with the ☽ diff. of dec. 5. 46. N.
	23	47	♂ in conj. with the ☽ diff. of dec. 4. 8. N.
20			Clock after the sun 6m. 33s.
	—		☽ rises 5h. 33m. M.
	—		☽ passes mer. 11h. 43m. M.
	—		☽ sets 5h. 42m. A.
	3	34	Ecliptic conj. or ● new moon
22	15	43	♃'s first sat. will im.
22	20		♀ in Perihelion
	22	30	☉ enters Libra,—Autumn commences
24	2	31	☿ greatest hel. lat. N.
25			Clock after the ☉ 8m. 16s.
	—		☽ rises 10h. 59m. M.
	—		☽ passes mer. 3h. 35m. A.
	—		☽ sets 8h. 7m. A.
28	1	38	Pallas in oppo. to the ☉ intens. of light 0·793
	7	27	☽ in □ or first quarter
	22	25	☿ in conj. with ♂ diff. of dec. 0. 54. N.
29	16	57	♃'s first sat. will im.

J. LEWTHWAITE, Rotherhithe.

THE

LONDON JOURNAL,

AND

REPERTORY

OF

Arts, Sciences, and Manufactures.

CONJOINED SERIES.

No. CLXXVIII.

RECENT PATENTS.

To Alfred Hall, *of Coxsackie, in the United States of America, brick-maker, for certain improvements in machinery or apparatus for making, moulding, or manufacturing bricks, tiles, and other articles, from earthy or plastic materials.*—[Sealed 2nd October, 1845.]

This invention consists in a peculiar construction of machinery, to be worked by hand and horse-power, for producing, in an expeditious and efficient manner, bricks, tiles, and other articles, from earthy or plastic materials. The moulding-machine is placed in direct communication with the pug-mill, in order to keep up a regular and continuous supply of clay to the moulds.

In Plate VIII., are several views of the improved machinery. Fig. 1, is a partial side elevation of the pug-mill, with the moulding-machine complete; fig. 2, is a plan view of the same; fig. 3, is a sectional elevation, taken in the line 1, 2, of fig. 2; and fig. 4, is a front view of the moulding-machine. A, A, is the pug-mill, set on brickwork B, B, and further supported by a pillar C. At the bottom of the mill is a metal step *a*, in which a vertical shaft *b*, works. This shaft is supported, at its upper end, by a framing, attached to the top of the mill, and is furnished with a lever, to which horse-power is applied for turning the same. Around the shaft *b*, a number of horizontal cutters or knives *c*, *c*, *c*, are set radially. The inner ends of the knives are chamfered off, so that the ends of two opposite knives may enter the same socket. When thus arranged, they are secured in their proper position by clinching, as shewn in the drawing. At the lower end of the shaft *b*, are four plates *d*, *d*, placed horizontally in two lines, so as to cross each other at right angles. These plates extend nearly to the sides of the pug-mill, and are for the purpose of sweeping the clay (as the shaft rotates) into the chamber of the moulding-machine. They are set at a slight incline from the perpendicular, and are secured to the shaft *b*. D, is the chamber which receives the clay or other plastic material from the pug-mill, and, for this purpose, fits close over the opening *e*, as will be hereafter described. The sides of the chamber are formed by two iron plates *f*, *f*, bolted to a strong frame-work E, E, which supports the various parts of the moulding-machine. *g*, *g*, is a cast-iron grating, bolted to the side-plates *f*, *f*, and forms the bottom of the chamber D. The construction of this grating will be clearly seen by reference to the detached view, fig. 5; it consists of a rectangular frame, with cross-bars or divisions, equal in number to the bricks or tiles to be produced at one working, or rather with the number of compartments in the moulds, which are successively placed beneath it. *h*, is a horizontal shaft, which has its bearings in the side-plates *f*, *f*, and is intended to carry the quadrant brackets *i*, *i*, which are each provided with a segment-rack. The shaft *h*, also carries a peculiarly-formed pressing-plate *k*, *k*, extending the whole width of the chamber D, and forming a partial covering thereto. This plate is intended to rise and fall, in order to force the clay in the chamber D, through the grating *g*, into the mould. To prevent the escape of the clay over the pressing-plate, a segment-piece is provided, which will be in close connection with a fixed scraper, hereafter mentioned. *l*, is a shaft, having its bearings in the side-plates *f*, *f*, and upon it two pinions *m, m,* are mounted: these pinions gear into the segment-racks on the brackets *i, i,* and are actuated by a hand-wheel *n,* keyed on the same shaft. *o,* is a rod, which passes through lugs or ears on the quadrant brackets *i,* and the pressing-plate *k,* and is intended to attach them together, in order that their movements (when the cog-wheels *m,* are caused to revolve) may be simultaneous; *p,* is a board, secured to the plates *f, f,* and is intended to cover the opening between the presser-plate *k,* and the side of the pug-mill; p^1, is a rod, having its bearings in the plates *f, f,* and serves to carry a scraper, which extends the whole width of the chamber D, and is for the purpose of clearing off the clay from the segmental portion of the pressing-plate *k,* at certain periods of the operations of the machine The rod p^1, also supports the catches *q,* which take on to a stud or pin on the pug-mill, and thus hold the chamber D, firmly thereto. Within the frame-work E, E, (which may be termed the stationary framework) an adjustable framing F, is suspended in the following manner:—Pendant from the upper part of the frame-work E, are four pins 1, 1, and 2, 2, tapped at their lower ends, and furnished with nuts. The pins 1, 1, support the brackets 3, 3, which slide in guides (see the front view, fig. 4,), and these brackets form bearings for a horizontal shaft 4. Upon the shaft 4, two sockets 5, 5, are keyed, which receive and support the arms 6, 6, attached to the framing F; and at the right-hand end of the shaft a lever 7, is keyed, as shewn in the drawing. The pins 2, 2, at the other end of the framework E, support a cross-bar 8, which carries the inner end of the framing F; and the parts in immediate connection therewith are thus described:—This framing is attached to, and forms one with, the cast-iron beds or gratings *r,* and *s,* which support the moulds for forming the bricks, tiles, or other articles. Between these beds, and immediately beneath the grating *g,* of the chamber which contains the clay, antifriction rollers 9, are loosely mounted; the top of the rollers being on a level with the upper surface of the beds. At the lower part of the framing F, are bearings, to receive a horizontal shaft, which carries a vibrating lever *t.* To the upper end of the lever *t,* a lever *u,* is jointed, which branches out into the form of a V, and turns up at its ends at right angles, to receive a pair of guide-wheels *w*, *w*. These wheels are each provided with a flange, which runs in a slot made in the upper face of the framing F, and to the ends of the V-lever a cross-bar *x*, is bolted. *y*, is a lever for actuating the lever *t*, and the parts connected therewith; and *z*, are the moulds, which are supplied to the machine by hand when required.

The action of the improved machine for moulding bricks, tiles, and other articles, is as follows:—Rotary motion being given to the vertical shaft *b*, of the pug-mill, the plates *d*, *d*, will force the clay through the opening *e*, into the chamber D; and, supposing a mould to be placed upon the rollers 9, in the position shewn at fig. 3, the hand-wheel *n*, is turned, which, giving rotary motion to the pinions *m*, in gear with the segment-racks, will bring down the pressing-plate *k*, and force the clay into the compartments of the mould. When a sufficient pressure has been put on the clay by this means, the workman pulls down the lever *y*, (at the same time letting go the hand-wheel), which action will cause the lever *t*, to vibrate and draw forward the lever *u*, and with it the cross-bar *x*. This bar, guided in its course by the wheels *w*, will push forward a mould previously placed in front of it, as at z^1, fig. 3, and drive that mould to the position of the mould *z*, now full of clay, from under the grating *g*; in escaping from which the superfluous clay will be removed by the inner edge of the inclined side of the grating. The full mould will then arrive at the position, on the framing, of the mould z^2, from whence it is ready to be carried to the drying ground. By throwing upward the lever *y*, the bar *x*, will retire to its former station, and another empty mould being placed before it, the same movement will be repeated after the mould last pushed under the grating *g*, is filled with clay, as before described. If, by accident, any stone or other hard substance should get into the clay and stop the proper action of the moulding-machine, it is only necessary to depress the lever 7, on the shaft 4, which will bring down the framing a sufficient distance for the mould to be released.

It may be here observed that, in order to insure the casting of perfect bricks, it is necessary to make the cross-bars of the grating *g*, so that that face of the bars which is nearest the centre of the grating shall project further over the divisions of the moulds than their opposite face; and thus the free lateral course of the clay is somewhat checked, which will prevent the sand from being swept from the sides of the mould. To prevent the oscillation of the inner framing F, short pins are made to project therefrom, and abut against the stationary frame-work E. It will be obvious that, by employing moulds of a suitable shape and a grating *g*, corresponding thereto, this improved machinery may be made to produce pantiles and draining tiles with great speed and precision.

The patentee claims, Firstly,—the general arrangement of the apparatus, as above described and shewn in the drawings. Secondly,—the peculiar arrangement and construction of the knives and plates for tempering the plastic composition, and forcing it out from the pug-mill. Thirdly,—the construction and application of an adjustable framing for holding the moulds to receive the plastic composition; such framing being capable of instant depression, as above explained. Fourthly, —the arrangement of apparatus for placing the moulds successively under the grating *g*, as above described and shewn in the drawings. And, Lastly,—the peculiar arrangement of the grating *g*, with respect to the compartments of the moulds, whereby perfect bricks, tiles, and other similar articles are produced, as above explained.—[*Inrolled in the Petty Bag Office, April,* 1846.]

Specification drawn by Messrs. Newton and Son.

To WILLIAM GREENER, *of Birmingham, in the county of Warwick, gun-maker, and* WILLIAM EDWARDS STAITE, *of Peckham, in the county of Surrey, Esq., for improved means of ignition and illumination.*—[Sealed 7th February, 1846.]

THIS invention consists in obtaining light by means of solid prisms or cylinders of carbon, enclosed in air-tight vessels of glass or other transparent substance, which prisms, when acted on by currents of voltaic or magnetic electricity, are rendered luminous (the carbon being previously freed from impurities, and divided on the surface into numerous acute points); or rods or strips of platinum, or other metal not easily fused, when divided on the surface into numerous acute points, and enclosed in transparent air-tight vessels, may be employed, together with currents of electricity, for producing illumination. The invention also includes the employment of hollow cylinders of carbon, either plain or acuminated, partially inserted within, and brought into perfect contact with hollow cones of platinum, either plain or acuminated; the whole being enclosed in transparent air-tight vessels, are rendered luminous by electric currents.

Carbon and platinum have been before used for the above purpose;* but the patentees state that carbon has been found to give out various extraneous matters, which interfere with the continuity of the light, and darken the glass vessel by deposits on the inside of the same; and from plain surfaced platinum only a feeble light has been obtained. In order to obtain carbon perfectly pure, or as nearly so as possible, the patentees digest a quantity of lamp-black, or pulverized charcoal, or pulverised coke (which has been purified from sulphur and other matters by the application of electricity, according to the method patented by J. Church, December 20, 1845,) in dilute nitro-muriatic or other acid; it is then strained from the acid, and washed several times in water; it is next washed in a weak alkaline solution; and, lastly, in distilled water, until no traces of impurity are perceptible. The purified carbon is thoroughly dried, and then converted into prisms or cylinders by means of an hydraulic or screw-press, in the same way as the porcelain buttons are made; and sometimes, to ensure perfect dryness and homogeneousness, the prisms or cylinders are exposed to an intense heat in a furnace for about twenty-four hours. The numerous acute points are formed on the surfaces of the prisms or cylinders by means of a saw, or by casting them in suitably-indented discs. The advantage obtained by opposing two such acuminated surfaces, the one to the other, is, that should the electric current cease between any two points (as frequently happens in the ordinary mode of igniting carbon by electricity, when there are only two points in opposition), the current will be kept up by the remaining points, and the light maintained without any material interruption or abatement. In some cases, a number of thin strips of charcoal, separated from each other by platinum foil, and bound together with platinum wire, are substituted for the bodies with acuminated surfaces; and sometimes, instead of employing either lamp-black, charcoal, or coke, plumbago or black-lead is prepared, formed, and used in the same way.

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* See the description of King's patent, in Vol. XXVIII., p. 348, of our present Series.

When platinum or other difficultly fusible metal is used as the illuminating medium, the number of separate points on its surface are multiplied as much as can be conveniently effected; and, for this purpose, the patentees either perforate a sheet of the metal with a great number of minute holes, or take it in the form of wire, and weave it into a gauze sufficiently thick to bear the heat produced by the electric current without fusing. When hollow cylinders of carbon are employed in combination with hollow cones of platinum, they are arranged in the following manner:—The two wires from a voltaic battery are each connected with a hollow cone of platinum, either plain or acuminated, and the cones are placed with their bases facing, but at a short distance from each other; the cones are then connected, by placing between them a hollow cylinder of carbon, either plain or acuminated, and inserting it so far into them as to be in perfect contact therewith all round. Such cones and cylinders may be used either in single sets, or in any number of sets which the battery or batteries employed may be adequate to supply. When the illuminating medium is placed in the transparent air-tight vessel, it may be either kept stationary or made to rotate.

The patentees claim, Firstly,—the employment, as a medium for the development and exhibition of electric light, of carbon, purified and prepared as above described. Secondly,—the employment, for the said purpose, of carbon and platinum, or any other like difficultly fusible metal, in solid prisms or cylinders, divided on the surfaces thereof into numerous acute points, or in such other forms as to present numerous acute points, as above described. Thirdly,—the employment, for the said purpose, of hollow cylinders of carbon, either plain or acuminated, in combination with hollow cones of platinum, or other like difficultly fusible metal, either plain or acuminated, as above described.—[*Inrolled in the Inrolment Office, August,* 1846.]

To Frederick Gye, *of South Lambeth, in the county of Surrey, Gent., for improvements in moulding sugar,—being a communication.*—[Sealed 20th November, 1845.]

The object of this invention is to dispense with the ordinary process of chopping or cutting refined or loaf sugar into pieces, which is productive of much waste; it consists in shaping the sugar into any desired forms for use by means of pressure in moulds.

The sugar is refined and formed into loaves in the usual manner; and after the loaves have been taken out of the moulds, the ordinary process of drying is carried on until the sugar is in such a state that it may be crushed by simply pressing upon it with a board. When the sugar is thus crushed, a small quantity of water is poured upon it, in minute streams, for the purpose of rendering it sufficiently soft to be submitted to pressure in moulds. The patentee employs a screw-press for carrying out this invention, but any other description of press may be used. To the framing of the press a quadrangular frame or plate, containing a large number of moulds or square openings, is fixed; beneath this mould-frame is a board (formed, by preference, of oak), supported by an iron-plate, which slides in grooves in the framing of the press; and above the mould-frame is a large plate, with a series of small plungers projecting therefrom, corresponding to the number of moulds in the frame. The moulds are filled with the crushed sugar, and the plungers being then brought down, by turning the screw of the press, the sugar in each mould is compressed: the depth of the moulds is equal to three times their diameter, and sufficient power is exerted to compress the sugar into one-third of the depth of the mould, and thus produce small cubes of sugar. The plungers are now raised, by turning the screw in the reverse direction; the iron plate that supports the board is removed, and the board is allowed to descend slowly with the compressed and moulded sugar from the moulds: the sugar is then placed in a stove, such as is now used for drying sugar, and when dry, it is ready for use.

The patentee does not claim any part of the press; nor does he confine himself to the above details; but he claims the shaping of sugar into suitable forms for use, by compressing the same in moulds, as above described.—[*Inrolled in the Inrolment Office, May,* 1846.]

To WILLIAM VINCENT WENNINGTON, *of Goscote Iron Works, in the county of Stafford, ironfounder, for certain improvements in, or improved methods of, cutting plate and sheet-iron.*—[Sealed 20th January, 1846.]

THIS invention consists in the construction of a machine for cutting plate and sheet-iron.

In Plate VIII., fig. 1, is a side elevation; fig. 2, is an end or front elevation; and fig. 3, is a plan of the machine. *a,* is the bed or foundation-plate, *b, b,* are two standards, fixed upon it, carrying a horizontal shaft *c,* upon the end of which is affixed a circular cutter-wheel or pinion *d,* having a circular steel cutter *e,* attached to it; and *v,* is the driving-shaft, supported by standards *s, s,* and receiving motion from a steam-engine or other first mover. *m, n,* are two mitre-wheels, fixed upon a hollow spindle *y,* through which the driving-shaft *v,* passes; these wheels are made to gear alternately into the mitre-wheel *l,* and thus cause the shaft *c,* and cutter-wheel *d,* to revolve in either direction. *e,* is a horizontal traversing-frame, moved to and fro on the rails *r, r,* by the cogged or toothed part *g,* of the cutter-wheel *d,* gearing into the rack *f,* on the inner side of the frame *e.* *k,* is a flat cutter, fixed to the frame *e*; a suitable distance or space *h*, being left between it and the rack *f*, to allow the cutter-wheel *d*, to revolve freely therein. *w*, is a horizontal shaft, beneath the foundation-plate, carrying at one end a forked lever *q*, which actuates a clutch *p*, on the spindle *y*, for the purpose of throwing the wheels *m*, *n*, alternately into and out of gear; at the other end of the shaft *w*, is a fixed lever *x*, which is operated upon by the adjustable tappets *y**, *y**, fixed on the frame *e*, so that when the frame has moved the required distance in one direction, the tappet striking against the lever *x*, changes the gear of the wheels *m*, *n*, and the frame is moved back again. *t*, *t*, are adjusting-screws, for tightening or easing the bearings of the shaft *c*, as may be required.

The following is the operation of the machine:—The plate or sheet of iron is placed upon the frame *e*, and presented, edgeways, to the cutter-wheel *d*; motion being then given to the shaft *c*, the wheel *d*, revolves, and, catching the plate or sheet of iron between it and the flat cutter *k*, cuts off the scrap of iron required, which drops into the space *h*, while simultaneouly therewith the cogged part *g*, of the wheel *d*, operates upon the rack *f*, and causes the frame *e*, to move away clear of the cutter. When the frame has been moved a sufficient distance in one direction, according to the length of the plate or sheet of iron, one of the tappets *y**, strikes against the lever *x*, and the clutch-lever *q*, is thus caused to change the gear of the wheels *m*, *n*, with the wheel *l*; and by this means the frame is moved in the opposite direction, so as to afford an opportunity of cutting both ways, if thought desirable.

The patentee does not confine himself to the above method of giving motion to or reversing the motion of the traversing-frame *e*; nor does he confine himself to any specific length of the frame *e*. The advantages resulting from the above combination of rotary and horizontal motion are stated to be, First,—that any length of plate or sheet may be cut. Secondly,—that the motion of the revolving cutter tends to draw the plate or sheet towards its cut; while, at the same time, the flat part of the circular cutter rolls the scrap as it passes out, and keeps it nearly straight. And, Thirdly,—that by reversing the motion of the cutter *d*, it is enabled to cut both ways.

The patentee claims, as his invention, the improved machine for cutting plate or sheet-iron, having a revolving circular cutter, and a horizontal traversing frame and cutter, as above described.—[*Inrolled in the Rolls Chapel Office, July,* 1846.]

To Frederick William Campin, *of Fleet-street, in the city of London, Gent., for certain improvements in obtaining and applying motive power,—being a communication.*—[Sealed 22nd January, 1846.]

The apparatus for obtaining and applying motive power, which constitutes the subject of this invention, is represented in Plate IX., and the following is a verbatim copy of the specification:—"Fig. 1, represents a sectional elevation of a portion of a passenger carriage, constructed according to the said invention; and fig. 2, another sectional elevation, shewing more clearly the internal arrangements. The propelling-apparatus consists, firstly, of springs A, A, to the ends of which are attached conical screws V, V, which press upon the wheels,—by the re-action of which springs, combined with the weight of the vehicle to be propelled, the centre of gravity is changed, and motion produced; and, secondly, of a set of pneumatic helicondal fly-wheels, or air turbines, by the aid of which the motion, so acquired, and the adhesion of the wheels are kept up.

"The principle on which the former portion of the invention depends will be understood by reference to the diagram, fig. 7. Let P, represent the primary force, and R, the secondary force; then, if both these forces are equal, and they are greater than a third force, suspended at T, motion will ensue; and if, instead of a straight lever, an endless chain is made use of, and P, is fixed, then, on turning, the action will become constant as long as R, is free to act through the piece O. The maximum effect will be always in a ratio with the suspended mass. Should the two forces (P, and R,) not be in exact equilibrium, either on account of the load being in-sufficient, or of any irregularities of the ground, a third force may be applied at M. Fig. 5, shews how the principle, thus demonstrated, is practically applied. When the detent D, is set free, the piece O, ascends, and the springs are loosened, and the conical screws, with which these springs are furnished, cause them always to act on the same particular part of the wheels, and hence the effect which is produced. The handle *h*, (see fig. 2,) connected with *m*, *m*, raises the fulcrum on the right or on the left, so that the motive power coming from underneath, through the medium of the piece O, may meet the re-acting motion backward or forward.

"The helicondal fly-wheels, or air turbines, are shewn in fig. 3. The spokes, it will be observed, of the two wheels intersect one another; that is to say, those of one wheel take into the spaces between those of the other wheel. They act on each other through the agency of the air, which is condensed in their semi-horns (the form assumed by the spokes), and are made to revolve in the same plane by straps, connected with the helixes.

"In figs. 4, and 6, the invention is shewn as applied to marine propelling. The hull of the ship serves, in this case, the office of the piece O, in figs. 1, 2, and 7; or the apparatus may be enclosed in a case, so constructed as to be supported upon its fulcra. D, and X, shew the first arrangement of the springs combined with the beam which acts as the detent. The racks, at the bottom, are merely introduced to shew, by their small range of action, the advantage gained by the substitution of the helixes. In the semi-plan, fig. 6, *q*, *q*, are throttles made in the bow, in order to force the air to be condensed upon the paddles *b*, *b*, (see fig. 3). This air re-acts afterwards at *z*, enters the turbines by the motion of the flaps, and produces two artificial wind-spouts, which may be moderated to any extent desired by slide-valves.

"And having now described the nature of the said invention, and in what manner the same is to be performed, I declare, that what I claim is, First,—the mode of propelling by means of springs, with conical screws acting directly on the wheels of vehicles, in combination with the weight of such vehicles, as before described and exemplified. And, Second,

—the employment of pneumatic helicondal fly-wheels, or air turbines, in connection with the means first herein claimed, as also before described and exemplified."—[*Inrolled in the Rolls Chapel Office, July,* 1846.]

To Frederick Rosenborg, *of the borough of Kingston-upon-Hull, Gent., and* John Malam, *also of the same place, Gent., for their invention of certain improvements in, or apparatus for, watering, manuring, and drying trees, plants, seeds, and roots, and for accelerating and improving the growth and produce of trees, plants, seeds, and roots.*—[Sealed 2nd October, 1845.]

This invention consists, firstly, of an improved method of infusing or diffusing through the ground, in which trees, plants, seeds, and roots are growing, either warm or cold water, or steam, or manure, either in the form of gas or liquid, or warm or cold air, according to the purpose which it is intended to effect. The improvements consist, secondly, in passing currents of electricity through fields or lands in which agricultural produce is growing, in order to accelerate the growth of the plants, and increase the produce thereof.

The method adopted for carrying into effect the first part of this invention consists in the employment of a series of tubes, pipes, or covered channels, made of earthenware, clay, or other suitable material, the top and sides of which are perforated with holes or slits. These pipes, tubes, or channels are laid down in the field or fields, at from one to to six feet, or at any suitable depth, below the surface, somewhat upon the plan that drain tiles are now laid down. The shape of the tubes, pipes, or channels is not material; and their depth below the surface, and also the distance they are placed apart, must be regulated according to circumstances and the nature of the soil. In order to water the field, or infuse humidity into the ground, warm or cold water, or steam, is made to circulate through the pipes or channels, which are all made to communicate with each other; and by the water or steam escaping through the perforations made in the same, it will diffuse itself through the soil, and communicate moisture to the roots of the trees or plants growing in the field, in a much more effective way than by surface watering, and with considerably less liquid.

In order to make the water or steam exude from the pipes or channels, such an amount of pressure as is necessary to effect this object is used; but the patentees do not confine themselves to any particular mode of imparting this pressure, as any of the plans found most convenient may be employed.

In order to manure a field, the manure is prepared and employed in two different forms, either of which may be used at pleasure. The manure may be prepared and used either in the form of steam, or a liquid, or in the form of gas. When the former plan is employed, the substances containing the requisite constituents of the manure are dissolved or boiled in water, and this liquid, or the steam therefrom, is conveyed, under pressure, through the perforated pipes, in the same way as the common water when required for watering or moistening the ground, as above described,—or the liquid manure, such as ammoniacal water, or other liquids, may be forced through the pipes in a liquid state, either cold or hot, as may be thought desirable. If the manure is to be used in the form of gas, an ordinary gas retort, or several retorts, must be provided to contain the gaseous manure in a latent state; and by exposing the retorts to heat, the gas will be obtained or driven off, in the same manner as in the manufacture of ordinary coal gas; and by the pressure from the retort or retorts, or by pumps, or other means, the gas is forced through the perforated pipes, and diffused throughout the adjacent ground, and among the seeds or roots.

In order to dry the earth around the seeds or roots, and to evaporate the water or superabundant moisture from the soil, the patentees cause hot or cold air to be forced by pumps, fans, or any other convenient means, through the above-described perforated pipes; which air, when escaping therefrom into the adjacent ground, will find its way to the surface, and carry off a considerable quantity of moisture. If it be desired to use warm or hot air, it may be heated in any convenient way.

In order to pass currents of electricity through, or beneath the surface of the ground, for the purpose of accelerating the growth and increasing the produce of trees, plants, seeds, and roots, a series of wires are laid down, at a convenient and suitable depth in the ground; and along these wires currents of electricity, obtained from a high-pressure steam-boiler or boilers, or from a powerful battery, are passed, from whence the electricity diffuses itself among the seeds and roots, and materially assists and accelerates vegetation.

In order to obtain electricity from steam-boilers, the boiler should be insulated, by being mounted upon columns or pillars made of glass, or in any other convenient manner, and the steam should be raised therein to a pressure of from 50 to 100 lbs. upon the square inch. The boiler will then give off a large amount of negative electricity proportionate to the pressure of the steam in the boiler. The electricity thus obtained is conducted from the boiler in precisely the same manner as from an ordinary electrifying machine, or from a charged battery; and by means of any of the ordinary kinds of conductors, such as chains or copper wires, the electricity may be conducted to any distant point, or through any given course or circuit. The electricity obtained in the manner above described is negative; but positive electricity may be obtained from the same source, by employing a number of jets of steam, emanating from the boiler, and directed severally towards a sharp brass point, a series of which must be mounted on an insulated frame, separate from the boiler; a brass or copper ball is placed at one end of the frame, and the positive electricity is conducted therefrom in the usual way. The positive electricity may be used for agricultural purposes in the manner above set forth, as well as the negative; but the apparatus necessary to obtain the former being more costly and complicated than that required for the latter, negative electricity may be perhaps most generally employed.

The patentees, in conclusion, state that they do not claim as any part of their invention, the laying down of pipes or tubes of earthenware or clay in land, for the purpose of draining, nor do they intend to confine themselves to any particular means of forcing the water, steam, air, or gases, through the perforated pipes or tubes; but they claim the mode or modes above described of watering, drying, manuring, and accelerating the growth and produce of trees, plants, seeds, and roots.—[*Inrolled in the Petty Bag Office, April,* 1846.]

Specification drawn by Messrs. Newton and Son.

To John Depledge, *of the Thorncliffe Iron Works, near Sheffield, in the county of York, draughtsman, for a certain improved metallic broacher.*—[Sealed 20th November, 1845.]

This invention is intended to obviate the inconvenience and waste usually attendant on the broaching of casks and vessels containing liquids, and consists in the application of a fixed broacher, by means of which casks or vessels may be tapped in an instant, without spilling any of the contents. The broacher will close the cask air-tight, and prevent it from becoming mouldy after the liquid has been withdrawn; it will also prevent any surreptitious drawing of the liquid, as it is impossible, when the broacher is closed and sealed, for any person to abstract a portion of the contents of the cask without detection.

In Plate X., figs. 1, and 2, are front views of the broacher; fig. 3, is a section of it in a closed state; fig. 4, is an external view of the broacher when open, shewing also part of the tap used therewith; and fig. 5, is a longitudinal section of the tap. *a,* is a hollow cylindrical piece of metal, having a flange *b,* at one end; it is made either plain on the outside, or with a screw formed thereon; and, in the inside, at each end, there are two or three threads *c,* forming a female screw. *d,* is another hollow cylindrical piece of metal, fitting into the piece *a*; it has a screw on its outer surface, to work in the female screw *c*; and at the outer end is a plate or cap *d**, before which a washer *e,* is placed, in order to close the broacher air-tight when the piece *d,* is screwed in. A series of holes *f,* are formed round the piece *d,* for the passage of the liquid; it has also a slot *g*, in each side, to receive a pin projecting from the tap; and on its outside is a pin *h*, to prevent it from being screwed out of place. *i*, is a plate that closes the broacher when the tap is taken out; this plate turns on a pin *i**, and is intended to receive a seal, to prevent any liquid being taken from the cask without discovery; it is shewn closed at fig. 1, and open at fig. 2;—the plate *i*, can be dispensed with, and a cork or piece of wadding inserted into the broacher. *j*, *j*, are holes for the screws by which the broacher is fastened to the head of the cask.

The tap used with the broacher (see figs. 4, and 5,) consists of a hollow piece of metal *l*, furnished with a plug *m*, which is turned by a key *n*, at the end. Through the body of the plug a passage is formed, the ends of which are seen at *o*, *o*; when the tap is open, the ends of the passage are opposite the openings *p*, *p**; but when the tap is closed, they are in the position shewn. A broad groove or channel is formed round the tap at *q*, *q*, so that when the end of the tap is inserted in the broacher, this channel will conduct the liquid that enters through the holes *f*, to the opening *p*. Two pins or projections *r*, *r*, are formed on the tap (see the end view, fig. 6,), and enter the slots *g*, in the cylindrical piece *d*, when the tap is introduced into the broacher, in order that as the tap is screwed into its place, the cylinder *d*, may be unscrewed or caused to recede, and the broacher thus opened. By a reverse movement the tap will be withdrawn, and the broacher closed. To make the tap tight when placed in the broacher, and to enable it to be screwed up, it is provided at *s*, with a fillet or packing of India-rubber, gutta-percha, or any other suitable material (worsted, waxed or greased, will answer), which, from its elasticity, will enter into the first threads of the screw *c*, in the broacher, and form as good a male screw as if made of metal; but this part may be made of metal, and a screw cut in it, if preferred. On the collar *t*, of the tap, there is an ear or lug with a hole through it; and on the flange *b*, of the broacher there is a similar perforated ear or lug, and these may be fastened together by means of a small padlock.

The patentee claims, as his invention, "the manufacture of metallic broachers with taps; which broachers, as well as the inserting ends of the taps, are made in the modes hereinbefore described; such broachers to be inserted into casks and other vessels; and which broachers, on the insertion of the tap or taps, by a screw or other traversing motion, open, and allow the liquid contained in the casks or other vessels to pass through them; and when the tap or taps are withdrawn by the same sort of motion, but reversed, will close such broachers, and thereby prevent the admission of air to the casks or vessels." But he does not confine himself to the precise forms or details shewn, provided the peculiar character of any or either part of the invention be retained.—[*Inrolled in the Inrolment Office, May,* 1846.]

To Edwin Chesshire, *of Birmingham, in the county of Warwick, surgeon, for improvements in apparatus to be applied to railway carriages, to reduce the prejudicial effects of collisions to passengers in railway carriages.*—[Sealed 3rd February, 1846.]

The object of this invention is to preserve those railway carriages employed for conveying passengers, from being materially injured in case of a collision taking place, either at the hinder end of the train of carriages, in consequence of an engine or train overtaking and running against the hindmost carriage,—or at the front end of the train, in consequence of the engine coming in contact with another engine, waggon, or other obstruction on the line of rails; or being suddenly stopped or retarded, in order to avoid coming into contact therewith; or being suddenly stopped or retarded by running off the rails. In case of collision from behind, the hindmost carriage will receive the first shock, and that shock will be communicated, with reduced violence, to the next carriage, and therefrom, with less violence, to the next carriage, and so on, in succession, to all the carriages; the engine-tender, in front of the carriages, receiving the least shock of all, although better qualified than passenger-carriages to endure the greatest part of the shock. And, in case of collision at the foremost end of the train, the most forcible shock will be given to the foremost carriage, and the shock will be communicated, with gradually decreasing violence, to the other carriages. When this invention is applied to railway carriages, the patentee recommends that a van or luggage-waggon be placed behind the last passenger-carriage of a train; and in case of a collision taking place from behind, the chief force of the shock received by that van or luggage-waggon will be transmitted direct to the engine-tender at the foremost end of the train (or to a van or luggage-waggon, which may be placed behind the engine-tender), without imparting any great portion of the said shock to the intervening passenger and other carriages. Should a collision at the foremost end of the train take place, the tendency of the van or waggon at the hinder end to run on toward the passenger-carriages will be resisted, and the chief force of the shock will be communicated direct from the van or waggon in front (or from the engine-tender) to the van or waggon at the hinder end of the train, without imparting any great portion of such shock to the passenger and other carriages.

The invention consists in the application, to each passenger-carriage of a train, of a safety-buffer, in addition to the ordinary buffers; this safety-buffer consists of a rod, with a buffer-head at each end, mounted in bearings carried by the under framing of the carriage, so as to be capable of moving endways in the same, and made of such length, that when the ordinary buffer-heads are in close contact, the heads of the safety-buffers will be at short distances apart, and only be brought into contact by a collision, when they will form, as it were, one firm unyielding bar, and transmit the shock from the van which first receives it direct to the van at the other end of the train.

The drawing, in Plate X., represents, in plan view, the under side of part of a train of railway carriages, with this invention applied thereto. *a*, is the van or luggage-waggon, which follows the tender; or, in case there is no such van or waggon, then *a*, will represent the tender; *b*, *b**, are passenger-carriages, provided with safety-buffers *c*, *c*; and *d*, overlapping portions of the tiles; and *c*, *c*, are the glass tiles, which are laid in parallel rows in the direction of the length of the rafters. The space between the flanges of the adjacent rows of tiles may be filled with putty or other suitable cement, and covered with a hollow beading of metal, glass, or other material, as exhibited at *d*, in the transverse section fig. 8. The tiles, thus laid, may be secured to the roof by various methods: the metal beading over the flanges might be made to answer this purpose, by being fastened to the laths with screws and nuts, having elastic collars to allow for expansion and contraction; or the tiles may be secured by thin metal strips screwed to or run into the laths, then passing between the tiles at their junction, and turned back over the edges of the upper tile, as shewn at *e*, in fig. 9.

The tiles may be applied to roofs in various other ways, one of which is represented at fig. 10, where the tiles are inverted in each alternate row, and lap over each other at the flanges, rendering beadings unnecessary; and the breadths of the tiles in the alternate rows may be varied, to produce roofs of different kinds.

The patentee does not claim the above methods of constructing the roof, or of pressing, moulding, or casting the glass; but he claims, as his invention, the adopting of glass, as herein set forth, for the purposes of roofing.—[*Inrolled in the Inrolment Office, June,* 1846.]

To SAMUEL HESELTINE, jun., *of Bromley, in the county of Middlesex, civil engineer, for an invention of improvements in machinery or apparatus for dressing stones for grinding corn, grain, and other substances,—being a communication.* —[Sealed 22nd December, 1845.]

THIS invention consists in a novel or improved construction of apparatus for holding and guiding the chisel, bill, or cutting instrument employed for dressing mill-stones while the operation of dressing is going on.

In Plate IX., fig. 1, represents a plan view of one of the improved machines; fig. 2, is a side elevation; and fig. 3, is a transverse section of the same, taken in the dotted lines A, B, and A*, B*, of fig. 1. *a, a, a,* is a solid block or plate of cast-iron, which forms the foundation or frame of the machine, and with which the other parts are connected. When the machine is in use, this plate is laid flat upon the stone, as seen in the figures, and in order to prevent it from moving or slipping thereon, its under side is furnished with pieces of wood, let into recesses provided for that purpose, and covered with leather or other suitable material, as seen at 1, 1, 1, in figs. 2, and 3. *b, b,* is a circular guide-rail, extending from end to end of the foundation plate *a, a,* and mounted in bearings or sockets at each end, as seen best in fig. 2. *c, c,* is a raised part of the foundation-plate, and forms a rail, upon which runs an antifriction wheel, connected with the sliding-carriage *d, d,* as will be hereafter more fully explained. This carriage *d, d,* is furnished with two ears or sockets *e, e,* which embrace the guide-rod *b, b,* but admit of the carriage being slidden with facility along the rod as the operation of dressing proceeds. The outer end of the carriage is supported by an antifriction wheel or roller *f,* which runs upon the raised rail *c, c,* as above mentioned.

The shaft which carries the arm or "thrift," to which the chisel is applied, is shewn at *g, g.* It is screwed at one end, and passes through a female screw, made in the hollow shaft *h,* as seen best in fig. 3. The opposite or outer end of the shaft *g, g,* is cranked, for the purpose hereinafter explained, and carries a rest or saddle-piece *i, i,* in which the chisel-holder is mounted, by passing it through a hole made in the saddle-piece, as shewn at *j,* fig. 3. This rest *i, i,* is curved at top, and forms a saddle to receive and support the right arm of the operator. The moveable arm or thrift has a socket *k,* at one end, furnished with a block of wood to receive the chisel, which is held firmly therein without any other fastening; and the socket and block of wood are constructed in such a manner as to enable a workman to use the mill bills in ordinary use. The opposite end of the moveable arm or thrift passes through a hole in the saddle-piece, and is made of such a length as to admit of its being slidden in and out to any required distance, to suit the convenience of the operator, and it is firmly secured in its place by a clamping screw *l*, above. The saddle-piece *i, i*, is mounted on the cranked end of the shaft *g*, so as to allow of its vibrating freely on its centre, and communicating to the chisel arm or thrift an up and down motion; but the saddle-piece is prevented from moving laterally by the clamping pieces *m, m*, by which it may be screwed up tight. As the continuous vibratory motion of the saddle-piece *i, i*, will cause the rubbing surfaces to wear away, this wear is compensated for by making the rubbing surfaces conical, as seen at 2, 2, in fig. 3, which will admit of their being screwed up close by the tightening nuts or clamps *m, m*. The saddle or rest, above described, may, however, be constructed so as to be fixed or independent of the holder or thrift; the saddle and cranked shaft, in such case, being made independent of each other.

As the cutting instruments with which stones are dressed cannot always be kept of precisely the same length, and as it is absolutely necessary that the cutting edge of the chisel should not only be quite straight and at right angles with its length, but also that it should strike the stone a fair blow, and in a perfectly vertical direction, the position of the fulcrum of the arm or thrift *j, j*, will require alteration from time to time, as the length of the chisel is diminished by wear. This is effected by simply raising or lowering the crank to which the rest or saddle *i, i*, is connected. It will be seen, on referring to the figures, that the cranked shaft *g*, is furnished with a feather *n, n*, and passes through a collar or cylinder *o*, placed inside one of the bearings; the feather *n*, on the shaft *g*, prevents it from turning round in the collar *o*, but allows it to be slidden laterally therein; and the collar *o*, is prevented from turning in its bearing (when not required to do so) by a clamping screw *p*, which holds it firmly, and yet allows the shaft *g*, to be moved laterally therein, as before mentioned. It will now be understood, that by merely loosening the clamping-screw *p*, the collar *o*, will be unclamped, and allowed to turn in its bearings, carrying with it the shaft *g*; and by this means, the crank, and consequently the fulcrum or axis of the chisel handle, or thrift, or arm, may be raised or lowered as required. This the patentee considers a very important improvement. The opposite end of the shaft *g*, is screwed, and passes through a female screw in the hollow shaft *h*, which also passes through the bearing *r*, and is furnished with flanges 3, 3, as seen in fig. 3, to prevent it from moving laterally. A collar is fastened to this hollow shaft *h*, by means of screws, as seen in the figures, and is furnished with a star-wheel *s*, whereby it is turned by means of the thumb of the left hand; and in order to regulate the fineness of the lines on the stone, and prevent the star-wheel *s*, from being turned too far round, the wheel *s*, is surrounded by, or enclosed within a guard-piece *t*, which prevents more than one arm of the wheel from being moved forward at one time, and also prevents the arm being moved more than the regulated distance. This part of the apparatus is shewn detached at fig. 4. The fineness of the dressing, or the distance of the lines made on the stone from one another, may be varied, by the employment of wheels with different numbers of arms, as shewn at figs. 5, and 6; and, by simply removing the screws 4, which fasten the star-wheel *s*, to the hollow shaft *h*, any other wheel may easily be applied to the machine, and exchanged for that previously in use, as will be readily understood. From this it will be seen that as the star-wheel *s*, is turned round, it will carry with it the hollow cylinder *h*, and thereby move laterally the cranked shaft, together with the chisel arm or holder, and chisel or cutting instrument.

The operation of the instrument or machine is as follows:—The machine having been laid flat on the stone, and placed in a proper position to commence operations (that is, to cut or dress the first line), the carriage *d*, which carries the chisel-handle or thrift, is slidden up to one end of the machine, and the workman commences his operations by taking hold of the chisel-handle or thrift with his right hand (his arm being supported in the saddle *i*, *i*,), and with his left-hand he lays hold of the hollow shaft *h*, his thumb being on the guard-piece *t*. By this means he has complete command over the carriage *d*, and can move it backward and forward at pleasure, within the limits of the machine; he then strikes the stone with the cutting edge of the chisel or bill, and can at every blow, if required, draw the carriage back until it arrives at the opposite end of the line which he is cutting. One line will thus have been dressed in a perfectly straight direction, and in order to dress another perfectly parallel to it, but close alongside of it, the carriage *d*, is moved forward again to the other end of the machine by the left hand of the operator, and the star-wheel *s*, is turned round one notch, which will move the chisel, bill, or cutting instrument, a short distance laterally; and by this means a second line, perfectly parallel to the first, may be produced, in the manner above explained; and, by repeating the operation, the whole of a segment of the surface of a stone is dressed, as shewn in fig. 7. The machine must then be removed, so as to dress another segment of the stone in a similar manner, and so on until the whole surface of the stone has been dressed.

The patentee claims, Firstly,—the general arrangement or construction of the several parts of the said apparatus or machinery, as herein-before described, for effecting the purposes aforesaid. Secondly,—the mounting of the bill, chisel, or cutting instrument in a socket, at the end of a handle, arm, or thrift, and furnished with a block or piece or pieces of wood, for holding the bill or chisel, in manner hereinbefore described. Thirdly,—he claims mounting the handle or thrift of the bill or chisel in a socket or rest, connected to a crank or excentric, so that the fulcrum or axis of such handle or thrift may be altered to suit the length of the bill or chisel which is used, and cause every part of the cutting edge to come in contact with the stone at the same time. Fourthly,—the employment of a saddle or rest to support the arm of the workman while at work, as hereinbefore described.—[*Inrolled in the Petty Bag Office, June,* 1846.]

Specification drawn by Messrs. Newton and Son.

To JOHN LORD, *of Friday Bridge, Birmingham, in the county of Warwick, merchant, for improvements in supplying steam-boilers with water,—being a communication.* [Sealed 15th April, 1845.]

THIS invention consists in a peculiar construction of self-feeding apparatus, to be attached to, or brought in connection with, a steam-boiler, for supplying it with water immediately upon the depression of the water-line.

In Plate VIII., fig. 1, represents the improved feeding apparatus, in side elevation; fig. 2, is a section, taken through the middle of the apparatus; and fig. 3, is a section, taken in the line 1, 2, of fig. 1, and shewing the apparatus attached to a boiler. To the side or end of the boiler a core or plug A, furnished with a flange *a*, is bolted, and at such a height that the water-line of the boiler shall be about the height shewn at fig. 3. In this core are two horizontal passages B, C, which have respectively a lateral opening *b*, and *c*, and a communication is made with the interior of the boiler and these passages. The smaller end of the core is closed, and fits into a conical seat D, similar to the plug of an ordinary tap. This conical seat D, is cast in one piece with a pipe E, and in the casting are made two passages *d*, *e*, which are intended to connect the lateral openings *b*, *c*, of the plug or core with a light hollow ball or other shaped chamber F, by means of the channels G, and H. At the lower end of this pipe E, a hinge-joint is to be provided, to connect it with the suction-pipe leading from the cistern or well, whence the water for supplying the boiler is obtained; which joint is to allow of the oscillation of the pipe and the chamber F, attached thereto, as will be presently explained. *f*, is a small cock, to let out the atmospheric air from the chamber F, immediately before operating with the apparatus; and *g*, is a valve for preventing the return of the water down the pipe E. To the upper part of the chamber F, a cord is attached, which passes over pulleys, and has a weight pendent from its end; this weight is intended to counterbalance the weight of the chamber, and the water which will be contained therein at certain periods of the operation of the apparatus, and to draw it into the elevated position shewn at fig. 4.

Having described the various parts of the improved self-feeding apparatus, the patentee proceeds to explain the mode of working the same. Upon the fall of the water-line in the boiler below the passage B, at which time the chamber F, is supposed to be in the position shewn at fig. 2, (that is, in its lowest position), steam will pass from the boiler along the passage B, through the opening *b*, up the passage *d*, and along the channel G, into the chamber F, and drive the water that may be presumed to have been therein along the channel H, and the passage *e*, through the opening *c*, along the passage C, and thence into the boiler. The chamber F, being thus lightened of the water it contained, will be drawn upwards, together with the conical seat D, and pipe E, by the counterbalance weight, into the position shewn at fig. 4, when the communication with the fixed core A, will be cut off. As the steam thus admitted to the chamber F, condenses, a partial vacuum will be formed, and water will rise, to fill up the vacuum, from the cistern or well up the supply-pipe E, lift the valve *f*, and, passing along the channel H, will flow into the chamber F. By this addition of the water to the weight of the chamber it will be brought to its original position, when the passages B, and *d*, coming again into connection, the steam will, in like manner, flow from the boiler to the chamber F, and a precisely similar effect will be produced to that just described. This operation will be repeated until the increased volume of water in the boiler shuts off the steam communication to the chamber F.

It will thus be evident, that according to the size of the apparatus a greater or less supply of water will be furnished to the boiler as it is required, without the aid of a steam-engine and pump. The apparatus may, if thought advisable, be placed in any convenient position away from the boiler, and the connection therewith may be maintained by two intermediate pipes, the ends of which shall enter the boiler at the height of the water-line.

The patentee remarks, that he does not confine himself to the precise construction of apparatus shewn and described, as several modifications might be suggested without departing from the nature of the invention; for instance, instead of the form of core shewn in the drawing, it may be advisable to turn the passages B, and C, at right angles, in opposite directions, and, in this case, use two conical seats D, which will be cast in one piece with the pipe E, as before explained; he likewise proposes, in some cases, to use a strong spring to force up the chamber to its highest position, instead of the counterbalance weight above mentioned. He claims the application to steam-boilers of an oscillating ball or chamber, by which water is supplied to such boilers upon the depression of the water-line, as above explained.—[*Inrolled in the Petty Bag Office, October,* 1845.]

Specification drawn by Messrs. Newton and Son.

To JAMES LAMING, *of Mark Lane, in the city of London, merchant, for an invention of improvements in making the cyanides and ferrocyanides of potassium and sodium,—being a communication from abroad.*—[Sealed 18th November, 1845.]

THE patentee, before describing the invention as communicated to him from abroad, has, for the better understanding of the improvements, detailed the chemical facts or principles upon which they are founded; these are as follow:—

1st. When animal matter, which contains nitrogen as well as hydrogen and carbon, is exposed to a high temperature, not exceeding low red, an equivalent of nitrogen combines with three equivalents of hydrogen to form an equivalent of ammonia, and the carbon is separated.

2nd. When ammonia is exposed to carbon at a full red heat, an equivalent of ammonia exchanges two of its equivalents of hydrogen for two equivalents of carbon, and thus becomes prussic or hydrocyanic acid.

3rd. If free potassium or sodium be also present, the equivalent of ammonia parts with all its three equivalents of hydrogen, and the nitrogen which remains takes in their place two equivalents of carbon to form cyanogen, and one equivalent of potassium or sodium, as the case may be, to form a cyanide of the metallic base.

4th. When animal matter is exposed to heat, its temperature becomes gradually increased to low redness before it assumes that higher temperature indicated by a full red color; therefore, whenever animal matter is subjected to what is called destructive distillation, the formation of ammonia must take precedence, in point of time, to that of prussic acid or of the cyanides.

5th. When the oxide of potassium, or of sodium, or the carbonate of either of those oxides, is intimately mixed with carbon, and exposed to a heat approaching to whiteness, its metallic base is set free from the oxygen with which it was previously combined, and rises in vapour. If ammonia comes into contact with the mixture of carbon and alkali, or of carbon and alkaline carbonate, the separation of the metallic base from its oxygen takes place at a lower temperature,—under such circumstances, a full red heat being sufficient. In the case of the carbonates, the metallic bases, potassium and sodium, are liberated from the carbonic acid also, whenever they separate from their oxygen.

6th. Cyanide of potassium, or cyanide of sodium, by exchanging an equivalent of every three equivalents of its base for an equivalent of iron, is converted into the corresponding ferrocyanide, or what is called, in commerce, prussiate of potash, or prussiate of soda; and this change may be effected by causing the cyanides of the respective metals, dissolved in water, to come into contact with iron, or oxide of iron, in a state of division.

The ordinary way of combining potassium or sodium with cyanogen, preparatory to making the prussiate of potash, or prussiate of soda, for commerce, is to expose in iron pots an impure carbonate of one of those alkalies and animal matter to a red heat, and to trust for the necessary contact of the nitrogen and carbon of the animal matter with the metallic element, to the thorough incorporation of the ingredients of the pasty mass by stirring. While the temperature of the animal matter is approaching redness, ammonia is constantly being generated, and as it is volatile, it escapes and is lost; and this continues until the heat becomes great enough to convert the nitrogen and carbon of the animal matter into cyanogen, and to fix that cyanogen, by combining it with the metallic base of the alkali. Another source of loss is, the difficulty of causing the different elements contained in the pasty mass to combine; for, before each can be brought into contact with the other, by mechanical agitation, their temperature becomes elevated, and great part of the resulting nitrogenous gases, which are volatile, have time to escape. There is a third evil attending the ordinary process, namely, the proportion of carbon in animal matter, compared to its nitrogen, is greater than that in the alkaline cyanides; the greater part of this carbon, from its fixed nature, remains to solidify the mass from which the nitrogen so freely escapes; so that it becomes necessary to suspend the addition of the animal matter, on account of the mass being too solid for the chemical action to go on before enough of nitrogen has been combined to convert much of the alkali into prussiate.

Two patents have already been granted for methods of preventing the losses sustained in the ordinary way of making the prussiates of potash and soda. By one of these methods the ammonia which is liberated from a heated mixture of alkali and animal matter, is conducted first over the surface of fused alkali (the said alkali having no admixture of carbon) and afterwards into a vessel containing a solution of alkali. The other of these methods directs that the ammonia, which results from animal matter exposed to heat, be made to pass upwards and downwards through a series of vertical pipes, arranged on the principle of inverted syphons, heated to redness, and charged with a mixture of charcoal, potash, and iron, reduced to small fragments. With regard to the former of these methods, it is well known to chemists that fused alkali has no power of decomposing ammonia into cyanogen unless carbon be present; and with regard to the latter method, it is obvious that, as the materials, if brought into a state of fluidity or pastiness, must, of necessity, choke the passage of the pipes, the method demands that the mixture in the inverted syphons be kept from losing its solid or granular state; and the continuance of that state is secured by the large proportion of infusible charcoal compared to the fusible potash, which the patentee prescribes, as fulfilling his intentions in a satisfactory manner.

Now, under the present invention, the patentee makes use of charcoal or other form of carbon, in powder, mixed with one of the alkalies, or its carbonate or other salt, capable, under the circumstances, of surrendering its metallic base to cyanogen. This mixture is constantly maintained in a fused state, so as to be fluid, or at least in a pasty condition, which is highly favorable for converting the metallic base of the alkali, or its salt, into a cyanide, and which takes place rapidly under such circumstances, when a current of ammonia gas is introduced to the fused mixture. The metallic base of potash, or soda, or of their compounds respectively, as the case may be, is liberated by the agency of the heated carbon, assisted by the affinity of the metallic base for the cyanogen, which is at the same time formed by the combination of heated carbon with the nitrogen of the ammonia; cyanide of the metallic base is thus produced, and this product is constantly augmented in quantity (the current of ammonia being continued) until great part of the alkali, or other compound of its base, has become converted into cyanide. When an alkaline carbonate is used, powdered charcoal, to the amount of more than 30 per cent. of its weight, may be added, without destroying the fluidity of the mixture if the temperature is raised to a full red. When the potash or soda is in a caustic state, a larger proportion of charcoal may be added; or, what is more advantageous, the mixture will remain fluid, although the heat be raised not so high. Whether the ammonia gas is passed through the mixture of carbon and fused alkali, or other compound of its metallic base (which is preferred), or over its surface, it is better to have more than one vessel charged with the heated materials, and so connected together by pipes, that the nitrogen of the ammonia, which escapes the chemical reaction in the first vessel, shall not pass through the whole series without combining. The apparatus thus acts on the principle of a series of Woolfe's bottles, and according to this invention all the vessels are made red hot, except the last, into which water, or some liquid convenient for arresting the vapours of alkaline metal, is put; or otherwise the vapours might be lost. The first product, as in the common process for making prussiate, is a cyanide of the alkaline metal present, which may be dissolved out from the mass, technically called "metal," by boiling the latter in alcohol, of about 0·896 specific gravity, from which, filtered hot, it spontaneously separates, in great part, on cooling. To obtain the ferrocyanide, the metal is to be treated in the usual way, namely, its soluble parts dissolved in water, then treated with iron, the solution evaporated, and, when sufficiently concentrated and clear, set aside to crystallize; and the rough product is afterwards purified by re-crystallization.

The patentee states, that he does not claim the invention of any process for dissolving out or obtaining either cyanide or ferrocyanide from the compound termed "metal;" nor does he claim the construction of apparatus wherewith the process or processes may be carried on; but he describes some arrangements which have been found to answer. One of these consists of three iron air-tight covered pots, communicating with one another in the manner of ordinary Woolfe's bottles: that is to say, the induction-pipe of the first pot reaches to near its bottom,—its eduction-pipe reaches down the interior of the second pot to near its bottom,—and the eduction-pipe of this second pot terminates in like manner in the third pot; while the eduction-pipe of the latter plunges beneath the surface of some water or other liquid, convenient for oxidizing and arresting vapours of alkaline metal. Each of the pots has a man-hole in its cover, by means of which it may be charged and discharged, and a door by which it may be perfectly closed. Each covered pot is so set in a furnace as to be heated to a temperature great enough to keep its contents in a state of constant fusion. Its charge, when fused, should about half fill it. By the use of this apparatus, the ammonia which is forced into the first pot, by reason of its own elasticity under the pressure attending its assumption of the gaseous state, passes through the fluid mixture of fused alkali and carbon in that pot,—being there decomposed into nitrogen or cyanogen, and, as cyanogen, combining with and saturating the alkaline metal present; after which, the ammonia or its nitrogen or uncombined cyanogen, which results from its action on the carbon still remaining in that pot, passes into the second pot, to convert the alkaline metal, there present, into a cyanide. In like manner the ammonia or its nitrogen, or the resulting cyanogen, may arrive in the third pot; then is the time for stopping the operation, in order that the two first pots may be emptied and re-charged. Owing to the volatility of the alkaline metals at high temperatures, the pipes of communication between the pots are apt to become obstructed; for this reason they are proposed to be made straight, and joined together at right angles, in such a manner that by removing a screw-plug from the end of each rectilinear piece, the passage through it may be cleared by passing into it a short rod of iron; in order that this process need not be often repeated, the diameter of the pipes should be as great as convenience admits of.

The patentee next describes a modification of the preceding apparatus, wherein no pressure is required to overcome the resistance opposed to the current of ammonia by the fluid mass into which the induction-pipes of the preceding apparatus are immersed. In this modification, all the induction-pipes stop short at the covers of the pots, except that of the open pot, which may be allowed, without much inconvenience, to dip below the surface of the water or other liquid intended to arrest the metallic vapours.

The ammonia gas, in this case, urged forward by an inconsiderable amount of pressure, comes into contact with the surfaces of the fused ingredients in the several pots in succession, until it is either decomposed and its nitrogen absorbed, as in the preceding case, or escapes by the last eduction-pipe of the series; to prevent which, either the number of pots may be increased, or, what is better, each of the three should be furnished with agitators, moved by machinery or labour. When the latter arrangement is adopted, each pot should be furnished with a lofty conical cover, containing, at its apex, a stuffing-box, in which the axis of the agitator turns, and which is kept sufficiently cool by a stream of water running through a small cistern, which embraces the stuffing-box. With this apparatus, the fused ingredients may be either in a fluid, semi-fluid, or pasty condition.

The patentee claims the making of the cyanides and ferrocyanides of potassium and sodium; or, as they are called in commerce, prussiates of potash and soda, in any suitable apparatus, by passing ammonia (either pure or mixed with such other gases as do not prevent the desired result) over the surface, or through the mass (according as the induction-pipes may dip or not below the surface) of potash, or soda, or other compound of potassium or sodium (capable, under the circumstances, of setting free its metallic base) in a state of fusion by heat, and mixed with charcoal or other form of carbon in powder, and in such proportion as to be adequate to effect, without destroying by its bulk, the fluid, semi-fluid, or pasty condition of the resulting mass. And, further, he claims, for the process or processes of this invention, the sole use of ammonia, or mixture, or combination of ammonia with other gases or vapours, whatever be the source from which it is obtained; provided always that in such mixture or compound there be no substance present capable, by its nature, of preventing the desired result. He claims, for example, the application to this invention of ammonia or carbonate of ammonia, obtained from gas-water, from urine, from the liquor condensed in the distillation of bones or other animal matter, or from one or other of the salts of ammonia, or a solution of ammonia; and also the ammonia or carbonate of ammonia which is obtained directly, mixed with other gases, in the carbonization of bones and other animal matters, and in the chemical treatment of guano. Whatever be the source from whence the ammonia is obtained, it is desirable that it should be made as free from the vapour of water as possible before it is introduced to the fused materials; for this purpose the substances from which it is to be eliminated may be dried, or else the ammonia may be passed, in an elastic state, in contact with some substance known to chemists to be convenient for dessicating that gas.

Instead of obtaining the ammonia by a separate process, or from a distinct vessel, the inventor sometimes causes it to be given off from animal matter contained in the vessel or vessels in which the cyanide is formed. For this purpose it is better to use the potash or the soda in a caustic state, causing it, while in that condition, to dissolve the animal matter. The following is the mode of proceeding:—A caustic solution of alkali, in water or other convenient liquid, is first made boiling hot, and to it, while boiling, as much animal matter is added as it will readily dissolve; the solution is next evaporated to dryness, and the mass preserved in that state for use. When a portion of this mass is put into each of the heated vessels, except the last, of such a series as has been described, and the last heated vessel is charged with carbon, mixed with some convenient compound of an alkaline metal, as before stated, then the ammonia, which escapes from any one of the vessels in the series, will have to pass through one or more subsequent vessels, and thus tend to suffer decomposition; the resulting nitrogen being converted into cyanogen, and then being absorbed. This admits of the cheaper kinds of animal matter being used,—such as the undried flesh and viscera of carrion, and old woollen flock and rags, which, by reason either of humidity or too great volume, cannot conveniently be mixed in their natural state with red hot alkali. The patentee claims this modification of the process as part of the invention for which this patent has been granted. Sometimes the mass resulting from the dessication of the solution of animal matter in caustic alkali is put into red hot open pots; in this case, much ammonia is lost, but the improvement which is introduced by replacing the ordinary mechanical admixture by an intimate chemical combination, affords a greater product in prussiate than can be obtained from an equal quantity of animal matter treated in the ordinary way.—[*Inrolled in the Petty Bag Office, May,* 1846.]

To William Milligan, *of Bradford, in the county of York, manufacturer, for certain improvements in the power loom.*—[Sealed 4th February, 1846.]

This invention consists, firstly, in so regulating the velocity of rotation of the cloth-beam, that it shall always decrease in the same ratio as its diameter is increased by the winding on of the cloth; the effect of which is, that the cloth beam will always draw off from the warp-beam a determinate length of warp for any given number of picks. Secondly, in so regulating the velocity of rotation of the warp-beam, that it shall always increase in the same ratio as its diameter is decreased by the delivery of the yarn. These improvements are effected by causing, in the one case, the continuous increase of the diameter of the cloth-beam to be the means of producing the corresponding decrease in velocity; and, in the other case, the continuous decrease of the diameter of the warp-beam to be the means of producing the corresponding increase in velocity.

In Plate X., fig. 1, is a side elevation, and fig. 2, a front elevation of so much of a power-loom as is requisite to shew the application of the first improvement. X, is the cloth-beam, and N, the wheel by which it is moved; M, is a pinion that gives motion to the wheel N, and is fixed on the shaft of a wheel L, which gears into a pinion K, on the shaft of a ratchet-wheel I. O, is a rod that rests on the top of the cloth upon the beam; its ends work in grooves or channels *a*, at each side of the loom, and it is raised higher and higher in the grooves by every additional fold of cloth. P, is a lever, inclined across the vertical line of direction of the rod O; it is mounted at one end upon a fixed centre T, and the other end is connected by a link Q, with a sliding rod E. As the rod O, rises, it presses against the lever P, and elevates it gradually towards a perpendicular position; and with every advance of the lever P, towards a perpendicular position, the sliding rod E, is pushed back by the link Q, and the length of its stroke is thereby shortened. The rod E, slides in links V, V, suspended from the top of the frame-work of the loom, and is connected at one end with the wheel-work N, M, L, K, and I, and at the other with the picking tappet, in the following manner:—A, is a regulator, keyed on the same shaft as the ratchet-wheel I, (outside of it); a^1, a sliding piece, which moves up and down in a slot in the regulator; B, a screw-bolt, carried by a collar at the top of the regulator, and working through a screwed orifice in the sliding piece a^1, whereby that piece is raised or lowered at pleasure; and *b*, is a nut, by which the sliding piece is made fast in any required position. R, is a lever, with a counterpoise weight R^1, situated at the bottom of the loom, and connected with the tail of the regulator A, by a chain S.—G, G, G, are three catches, secured to the top of the regulator by the pin H, and taking into the teeth of the ratchet-wheel I.—C, is an excentric wheel, attached to the picking tappet C^2, at any desired degree of excentricity, by means of a sliding knob *c*, which passes through a groove D, in the excentric, into a corresponding groove in the tappet. E^2, is a bar, projecting downwards from one end of the sliding rod E, and which, being caught by the periphery of the excentric C, as it revolves, moves forward the rod E.

The mode of operation is as follows:—The height of the sliding piece a^1, of the regulator A, which is connected by a chain with the rod E, is first adjusted according to the number of picks per inch intended to be laid in; and the regulator A, and lever P, are drawn back by the help of the lever and weight R, R^1, as far as the rod O, will allow. The loom being then put in motion, the excentric C, during one half of its first revolution presses against the bar E^2, of the rod E, and pushes it out to an extent equal to the difference between its shorter and longer radii, whereby the regulator A, is drawn forward to a corresponding extent, while the catches G, G, G, attached to the top of the regulator, bring round the ratchet-wheel I. During the remaining half of the revolution of the excentric, the rod E, becoming freed from the excentric, is drawn back by the lever and weight R, R^1, as far as the rod O, will permit, and the catches G, G, G, are raised out of their places, and lifted as many teeth back as may be equal to the distance re-traversed; the three catches W, W, W, attached to the wheel N, preventing the ratchet-wheel I, from running back while the change in the position of the catches G, is taking place. It will be understood, that while the catches G, are always drawn the same distance forward during one half revolution of the excentric, the distance to which they are pulled back during the other half of the revolution will be less every time, as the rod O, is raised by the winding of the cloth on the cloth-beam. The fixed centre T, should accordingly be so placed, that the distance from it to the point where the lever P, comes in contact with the rod O, shall always be exactly half the diameter of the cloth and the beam.

A modification of the above is shewn at fig. 3. O, is the cloth-beam rod, as before; but, instead of being situated at the top of the cloth-beam, it is placed towards one side of it. *b*, is a pusher-bar, attached to one end of the rod O, having a forked end, by which it embraces a hanging lever *a*, suspended from a pin *e*, and presses that lever forward when it is itself moved forward by the increase in the diameter of the cloth-beam. *f*, is a chain or cord, attached at one end to the rod O, and passing round a pulley *d*, on the pin *e*, is looped round the end of the pusher-bar *b*; so that, as the rod O, and pusher-bar *b*, are pressed forward, and the distance between the rod O, and pulley *d*, is thereby diminished, the weight of the bar *b*, will draw the chain or cord *f*, down a corresponding extent. The hanging-lever *a*, on being pressed forward by the bar *b*, is stopped by a stud *c*, attached to the end of the rod E, and the backward movement of the rod E, after it escapes from the action of the excentric C, is consequently shortened to the same extent that the pusher-bar is moved forward by the increasing diameter of the cloth-beam.

Another arrangement for carrying out the first part of this invention is shewn at fig. 4. Here the regulator A, excentric C, and sliding rod E, and their accessaries, are dispensed with, and the diminution in the velocity of rotation of the cloth-beam is accomplished in the following manner:—F, is a three-armed lever, called the "taking-in lever," that turns on a stud Q; in one arm f^1, of this lever there is a slot G, to receive a pin E, fixed on a curved rod *e*, projecting from the rod O, which, as in the last arrangement, is placed at one side of the cloth-beam; D, is a rod for connecting the pin E, with a horizontal lever C, at the bottom of the loom, furnished with a counterpoise weight H.—W, is a regulator, fixed at right angles to the lever C, and having a long slot in it for the reception of the smaller end of that lever; and B, is a screw-pin, which is passed vertically up through the regulator W, into the slot, so as to press against the lever C.—Y, is the ley or ley-arm, provided with a pusher-rod Y^2, which, as the ley is pulled back, presses against the arm f^2, of the taking-in lever. V, is a groove, along which the rod O, moves, as it is pressed forward by the winding of the cloth upon the beam. N, M, L, K, are a series of wheels, which communicate the motion of a ratchet-wheel I, to the cloth-beam. P, P, P, are three catches, which turn on the stud Q, and take into the teeth of the ratchet-wheel I.—P^2, P^2, P^2, are three longer catches, attached to the outer end of the arm f^3, of the lever F, and taking into the ratchet-wheel I, in advance of the other catches.

At every backward pull of the ley Y, the pusher Y^2, presses forward the arm f^2, of the lever F, to one given point, and thereby carries round the catches P^2, the same given number of teeth each time; but when, on the return-stroke, the lever F, is freed from the pressure of the pusher Y^2, the catches P^2, are drawn back (by the action of the weighted lever C, through the connecting-rod D, on the lever F,) as far as the screw B, will allow the lever C, to descend. It is obvious, that the distances to which the catches P^2, are drawn back each time may be increased or diminished, by previously raising or lowering the screw B, and that this affords a certain means of determining, beforehand, the number of picks per inch to be laid in. It is necessary, at the same time, that the length of motion given to the catches P^2, should decrease in proportion as the diameter of the cloth-beam increases; this is effected by the forward movement of the rod O, causing the pin E, on the rod M, to move in the slot G, further and further from the centre of the stud Q. If the pin E, is placed in the beginning with its centre at a distance from the centre of the stud Q, equal to half the diameter of the cloth-beam and cloth, it will always preserve its proper relative distance, because it can only be pressed outward from the centre of the stud Q, in exactly the same degree as the diameter of the cloth-beam is increased. The catches P, serve to hold the ratchet-wheel I, whilst the catches P^2, are being drawn back by the weighted lever C.

The arrangement for carrying out the second part of this invention is represented at figs. 5, and 6. The parts C, B, and I, are such as have been before described. B, is the warp-beam; K, is an upright bar, fixed to the end of a sliding bar E, and connected by a link *e*, with a lever *f*. Y, is a worm-wheel, on the gudgeon of the warp-beam, driven by a worm *n*, on the shaft A, at the lower end of which is a mitre-wheel *p*, taken into and driven by another mitre-wheel *q*, upon the axle of the ratchet-wheel I. In the frame of the loom, above the warp-beam, a slot Z, is made, to receive a cranked bar J, the end of which rests upon the warp-beam: that part of the bar J, which plays in the slot is made square.

The action of the apparatus is as follows:—The reciprocating motion of the bar E, with its upright K, alternately raises the lever *f*, to a vertical position, and causes it to fall against the crank J, which, descending as the yarn unwinds, gradually allows the lever *f*, to increase its motion, whereby the catches G, are made to take a greater number of teeth on the ratchet-wheel I, at each stroke, and thus the mitre-wheels *p*, *q*, the worm *n*, and the worm-wheel Y, have a quicker rotating movement communicated to them; which movement equalizes the delivery of the warp from the warp-beam.

The patentee states, that each of the methods above described may be varied; and that any of the methods for regulating the velocity of the cloth-beam may be employed for causing the velocity of the warp-beam to increase with the quantity of yarn given out by it; and also that the method of regulating the velocity of the warp-beam may be employed to regulate the velocity of the cloth-beam. He claims, Firstly,—the method or system of causing every increase in the diameter of the cloth-beam and cloth to produce, of itself, a proportional decrease in the velocity of the cloth-beam, as above described. Secondly,—the method or system of causing every decrease in the diameter of the yarn-beam and yarn to produce, of itself, a proportional increase in the velocity of the yarn-beam, as above described.—[*Inrolled in the Rolls Chapel Office, August,* 1846.]

To William Benson, *of Allerwash House, Haydon Bridge, Northumberland, Gent., for certain improvements in machines for the manufacture of tiles and other plastic substances.*—[Sealed 15th January, 1846.]

The object of this invention is to manufacture tiles, pipes, and other articles, by forcing the clay or other suitable material through dies, secured to the side of a mill, similar to an ordinary pug-mill.

In Plate IX., fig. 1, is an elevation of the machine, furnished with dies for making both drain and ridge-tiles at the same operation (drain-tiles on the right and ridge-tiles on the left); fig. 2, is a horizontal section; and fig. 3, is a vertical section thereof. *a*, is the cylinder of the mill, made of cast or wrought-iron, and fastened to a cast-iron bed-plate *b*, by eight iron screw-bolts *c, c*; this bed-plate (shewn separately at fig. 4,) rests upon two pieces of timber *d, d*, about six inches square, and in length equal to the width of the foundation-stones *e, e*; and it is secured to the foundation-stones by four iron screw-bolts *f, f*;—*g*, is the vertical shaft of the mill, with a bevil-wheel *h*, keyed on its upper end, and taking into the teeth of the bevil-pinion *i*, on the shaft *j*, which is driven by steam, horse, or other power. The lower end of the shaft *g*, passes through the bed-plate *b*, and works in a brass step *k*, placed in a square box, formed on the plate *l*; and which step is capable of adjustment by means of screws. The upper end of the shaft *g*, works in brass bushes, fitted in the iron beam or carriage *n*, which is bolted to the cylinder *a*; the beam or carriage *n*, is hollowed out on the under side to the shape of the segment of a circle, so as to leave sufficient room at the top of the cylinder for feeding in the clay. Near the lower end of the shaft *g*, there is a flange, to which is bolted a cone *o*, formed of wood, iron, or other suitable material. *p, q*, are arms or knives, fixed around the shaft *g*; they are twenty-three in number, arranged in six planes; but there may be a greater or less number of knives and planes; for instance, a machine which is to be worked by one horse should be of smaller dimensions, and would require a less number of knives and planes; but in no case ought there to be less than three or four knives on the two lower planes, and two on each of the upper planes; and there should not be less than three or four planes of knives. In the lower plane of the arrangement represented at fig. 3, six curved knives *q*, are inserted into the shaft *g*; in the second plane there are six straight knives *p*, fixed immediately above the curved ones, and set at an angle of 45°; the third, fourth, and fifth planes have three straight blades, fixed at an angle of 45°; and in the sixth plane there are two straight blades, set at the same angle. It is necessary that the five upper sets of knives should be placed at or as near as possible to the angle mentioned, and that the bottom of the spindle should be conical, in order to facilitate the passing of the clay or other plastic material to the bottom of the mill, and as much as possible to the outside of the lower set of knives *q*, which, from their peculiar shape and position, press it through the dies *r*, *r**. The dotted circles, outside the curved knives, shew the position occupied by the clay when the spindle is in motion; and as the clay descends in the mill, it is pushed towards the dies by these arms, with the assistance of the cone.

The dies *r*, *r**, are slipped into dovetail grooves *s*, formed on the outside of the cylinder *a*, and in the bed-plate *b*, (see fig. 4,); the shape of the openings in the dies will necessarily vary with the form of the tiles or pipes required to be made;—the dies represented in section at *r**, are for making drain-tiles; and the die at *r*, is for ridge-tiles. *t*, *t*, are the tables for receiving the tiles or pipes as they come out of the dies; these tables are furnished with rollers *u*, *u*, which carry endless bands or webs of flannel or other suitable flexible material; and the webs are tightened, as occasion may require, by adjusting screws, connected with the moveable bearings of the last rollers in each table. In fig. 2, the tables *t*, *t*, are shewn in plan view; Nos. 1, and 3, are covered with the flexible webs; No. 2, is uncovered, but with the rollers inserted; and No. 4, shews the top of the frame, without the rollers or web. *w*, *w*, are the tiles, which traverse the endless webs by the motion they receive in coming out from the cylinder *a*; and as soon as a sufficient length of tile has passed on to the endless web, it is cut off by the instrument *x*, commonly called the "horse."

In working this machine, tiles or pipes can be made on the four sides of it at the same time, or at one, two, or three sides thereof, or more, if required; and different sorts of tiles or pipes can be made at the same time; for instance, drain-tiles may be produced on the right side, ridge tiles on the left, pipes at the front, and flat tiles at the back.

The patentee says, that although he has described several parts belonging to an ordinary pug mill, he makes no claim separately thereto; neither does he claim producing tiles by a pug mill, without the assistance of any other second machine; nor forcing clay through dies of metal, to form tiles or pipes; nor cutting such tiles or pipes off by means of the instrument usually called the "horse;"—but what he claims is, "Firstly,—the manufacture of tiles, or pipes, or other similar articles, with clay, soil, or other suitable material, forced through dies, of the form hereinbefore described, or any other suitable form, placed at the sides of mills, in manner and form and similar to those hereinbefore described, or forced through at one, two, or any suitable number of sides to such mills. Secondly,—the peculiar formation of the spindle of such mills, so far as casting the same with a flange, and filling up with timber or other suitable material that part thereof which is conical or bell-shaped, and forming and fixing the two under sets or planes of arms or knives in the peculiar form and position as described as aforesaid. And, Thirdly,—the formation of machines and dies for forcing out and forming tiles, pipes, or other similar articles from clay or other suitable materials; such machines and dies to be made in the mode and form hereinbefore described."—[*Inrolled in the Inrolment Office, July,* 1846.]

To James Donaldson, *of Haslingden, in the county of Lancaster, woollen printer, for certain improvements in the process of scouring, bleaching, and washing wool, cotton, silk, and other fibrous substances, both in a raw or manufactured state.*—[Sealed 20th November, 1845.]

This invention of improvements in the process of scouring, bleaching, and washing wool, cotton, silk, and other fibrous substances, consists in the employment or use of a novel compound or mixture of materials to be substituted in place of urine and other matters now commonly employed in such processes. The improvements are effected by the use of a compound, produced according to the following formula:—Boil twenty pounds of potatoes in three gallons of water, and crush them into a paste, then gradually introduce thirty pounds of soda-ash, and, after the addition of two gallons of spirits of ammonia, stir the ingredients well together. When well mixed add, by degrees, sixty pounds of common salt. This will make about one hundred weight of the scouring or bleaching compound, which, when well mixed, must be spread in a shallow vessel, similar to a brewer's cooler, for the ready action of the atmosphere; thus allowing the oxygen to dissipate the spirit. This compound may be made in large quantities, if thought desirable, and stored for use, as it does not deteriorate in quality, either by age or exposure; and, in some cases, a small quantity of lard or other grease may be added, to prevent the crystallization of the ingredients.

The patentee claims the employment or use of the above-described composition in the processes of scouring, bleaching, and washing wool, cotton, silk, and other fibrous substances, both in a raw or manufactured state.—[*Inrolled in the Petty Bag Office, May,* 1846.]

Specification drawn by Messrs. Newton and Son.

To PETER BANCROFT, *of Liverpool, in the county of Lancaster, merchant, for his invention of certain improvements in the method or process of refining and purifying animal and vegetable oils, and grease.*—[Sealed 25th February, 1846.]

THE nature of this invention consists in a process or processes of refining or purifying certain vegetable and animal oils, whereby they are better suited for lubricating the working parts of machinery; also in a process of refining or purifying tallow, to improve its lubricating quality; and likewise in a process of purifying and sweetening inferior descriptions of lard, and rendering them fit for human food, and applicable to all purposes for which the best Irish lard is now used. The vegetable oils which the patentee proposes to refine for the above purpose are, the common olive oils, Galipoli, Spanish, Portugal, Sicily, and such like qualities of olive oils. It is well known that these oils, when applied in their impure state to the working parts of machinery, quickly become glutinous, act injuriously upon the brass-work, and impede the proper working of the machine. This effect is produced by the action of the air upon the impurities contained in the oil, when the oil is exposed in small quantities. To remove this hurtful matter, the oil, when heated to about 90°, or thereabouts, is treated with a strong solution of potash or soda, either in the state of a carbonate, or made caustic by lime. The use of the alkali, in a caustic state, is generally preferred, in consequence of its producing less effervescence in the oil, and the operation being more quickly finished than when the carbonates of either of the above alkalies are made use of. The specific gravity of the alkali solution may be 1.2, or even stronger. During the time that the alkali is being added, the oil is to be kept in a constant state of agitation to cause a thorough mixing. In order to ascertain when the operation is completed, and a sufficiency of the solution is added, the following test may be used:—Put a small portion into a glass-bottle, or any other convenient vessel, and add to it a solution of the alkali in excess. Shake it well, and then allow it to remain at rest for a quarter of an hour, or until the alkali has settled to the bottom of the vessel. Should the alkali settle quite clear, without causing a thick deposit to take place, the oil is sufficiently refined; if it does not remain clear, but carries down with it a thick soapy matter, more alkali is added to the oil under operation, until, on further trial, this effect takes place. The quantity of alkali required will depend entirely upon the quality of the olive oil operated upon. In practice it will be found that some qualities require as much as 8 per cent. of solution of specific gravity 1·2, while other qualities do not require more than 3½ per cent. When the above operation is completed, the oil is allowed to remain at rest for twenty-four hours, or until such time as the thick soapy matter, formed in the oil by the alkali, has subsided; the supernatant oil may then be run off and passed through a filter. It is stated, that oil thus operated upon will not tarnish the most delicate brass work, nor will it become thick and glutinous upon exposure to the air. The animal oil which the patentee prepares for lubricating purposes is the oil expressed from lard; and the process of refining this oil is exactly similar in all its details to that described above.

Before explaining his mode of purifying tallow, so as to make it fit for lubricating, the patentee remarks that all tallows are not applicable, those suited to the purpose being such as are termed in commerce Y. C., of light yellow color, and sweet or good home-rendered tallow. Tallow of such description is melted by steam or other heat, and when the tallow has become fluid, but before it has become much heated beyond its melting point, a strong solution of potash, or soda, either caustic, or in the state of a carbonate, and of specific gravity 1·2, or thereabouts, is added; the tallow being kept in constant agitation during the introduction of the alkali. Upon the first introduction of the alkali solution a very thick soapy matter is precipitated; the operation is completed when, upon a further addition of the alkali, this effect ceases to be produced; the tallow is then heated to about 180° or 200° of temperature, after which it is allowed to rest for twenty-four hours or more, according to the quantity operated upon and the heat of the weather. When it is perceived that the tallow in cooling is becoming lightly opaque, it is run off into casks, and while cooling must be well stirred, to prevent it from granulating.

The process of refining and sweetening American and inferior lards is as follows:—In using American lard, it is, in most cases, too soft and oily; it is, therefore, advisable first to extract a portion of the oil by pressure; the lard is then melted by steam or other heat, and a strong solution of potash or soda, or carbonate of these alkalies, is added, as before, with constant agitation of the lard. It should be observed, that a weak solution of the alkalies is to be avoided, and that the stronger or denser they are made, the more perfectly will they separate the impurities from the oils and fats. The matter which is precipitated in the refining of the above oils and fats may be used in the manufacture of soap; the nature of the soap depending upon the alkali made use of. If it is required, an inferior oil or fat may be recovered from the deposit formed by neutralizing the alkali by an acid. For this purpose, the sulphuric acid, diluted with water, may be employed.

The patentee states that he is aware of the alkalies potash and soda having been used and recommended for the purification of oils and fats, but to the best of his belief they have never been employed for the purification of the oils and fats mentioned above, when those oils are refined for the purpose of being applied as described. He therefore claims the refining and purifying of olive oils, lard oil, tallow, and lard, for the purposes already mentioned, by treating them as herein described.—[*Inrolled in the Petty Bag Office, August,* 1846.]

Specification drawn by Messrs. Newton and Son.

To Robert Warington, *of Apothecaries' Hall, in the city of London, chemist, for certain improvements in the mode of preserving animal and vegetable substances.*—[Sealed 5th March, 1846.]

The first part of this invention consists in preserving animal and vegetable substances by coating them with common glue, gelatine, or concentrated meat gravy, or otherwise, so as to form an air-tight skin or covering over them.

A quantity of glue, gelatine, or concentrated meat gravy, is heated in a suitable vessel, and then the meat or other substance to be preserved, having been suspended from a string, is dipped into it; and when the coating of glue, gelatine, or gravy has solidified, the meat is again dipped; and this is repeated until a hard film or skin, of the desired thickness, has been obtained. Or the substance to be preserved is dipped into a mixture of plaster of Paris and water, and, when the coating has become hard, it is saturated with melted suet, stearine, wax, or other matter that will render it impervious to the air. Or the patentee wraps around the substance to be preserved a thin strip or band of caoutchouc, gutta-percha, or any air-tight membrane, such as waterproof cloth, making each turn lap a little over the other; and when caoutchouc or gutta-percha is used, the edges of the band are cemented together by immersion in boiling water; or the edges of the band may be connected by a cement of caoutchouc or gutta-percha (dissolved in spirits of turpentine, bisulphuret of carbon, or other solvent), or any other suitable cement. Or the patentee covers the surface of the substance to be preserved, either before or after the operation last described, with a varnish or cement of caoutchouc, or gutta-percha, or other suitable varnish or cement.

The second part of this invention consists in keeping the articles so coated, or any other animal and vegetable substances, immersed in glycerine, treacle, elaine, oils, and other like matters, not liable to such oxidation, decomposition, or other change from exposure to the atmosphere as would prevent the preservation of the animal and vegetable substances; these matters being kept in tight, but it may be open, vessels; and the animal or vegetable substances are only disturbed when removed for use.

Meats for the table should be half cooked, by boiling or roasting, previous to coating or submersion. When oils are used, the patentee prefers that they should be heated to 220° Fahr., the articles are then immersed, and the oil is allowed to cool. Fats, oils, and waxy substances, which present a solid appearance at the ordinary temperatures of the atmosphere, should of course be melted previous to the immersion of the articles therein.

The patentee claims, Firstly,—the coating of animal and vegetable substances, as above described, for the purposes of preservation. Secondly,—the immersion and keeping submerged of such coated or other animal and vegetable substances in glycerine, treacle, elaines, oils, and other like matters which are not liable to such oxidation, decomposition, or other change from exposure to the atmosphere as would prevent the preservation of the substances to be preserved; these matters aforesaid being kept in tight, but it may be open, vessels, and the substances aforesaid only disturbed when removed for use.—[*Inrolled in the Inrolment Office, September,* 1846.]

To Robert Lewis Jones, *of Chester, railway agent, for improvements in reducing charcoal and other similar matters to powder, and in treating the same when in a state of powder, so as to render them suitable to be used in place of vegetable black, drop black, lamp black, and other matters.*—[Sealed 5th March, 1846.]

The first part of this invention consists in using currents of air to separate the fine from the coarse particles of charcoal or charred peat, when grinding the same; which fine particles may be employed instead of vegetable black, drop black, and lamp black, and also as a substitute for, or combined with, black lead, in the preparation of mixtures for lubricating axletrees and machinery; the coarser particles may be used by iron-founders and others. This invention consists, secondly, in separating the fine from the coarse particles of ground charcoal or charred peat by currents of air, after the same has been ground in the usual manner.

The charcoal or charred peat may be ground in any convenient close mill, but the patentee prefers one of the kind employed when grinding charcoal for the use of iron-founders; and he applies a cover thereto, containing holes for the entrance of the air, and furnished with valves to regulate the supply. From the top of the mill a pipe extends to a rotary fan or other exhausting apparatus, which is connected by another pipe with a long chamber, so constructed that the finer particles may be deposited therein and the air pass away. The chamber is thirty feet long, ten feet high, and ten feet wide; the top, one end, and one side, are composed of calico, stretched on light wooden framing, and the other side and end are formed by a wall. The action of grinding will cause the finer particles to rise in the mill, and they will be carried off by the currents of air into the long chamber, where they will be deposited on the floor, or in pockets descending from the floor or other part; and the powder will be of different degrees of fineness, according to the distance from the entrance of the chamber to the place where it is deposited. Although the patentee prefers the apparatus and means above described, for grinding and producing currents of air, he does not confine himself thereto.

When the charcoal or charred peat has been ground in the ordinary manner, without the employment of currents of air to separate the fine from the coarse portions, the powder is introduced into a covered cylinder or other convenient vessel, provided with a stirrer, and connected with an exhausting apparatus (similar to the mill above described), by which the fine particles are caused to proceed to the long chamber wherein they are to be deposited; the coarse particles remaining in the cylinder.

The patentee claims, Firstly,—the separating the finer from the coarser particles of charcoal or charred peat, when grinding, by currents of air, as above described. Secondly, —the separating the finer from the coarser particles of ground charcoal or charred peat by currents of air, after grinding, as above described.—[*Inrolled in the Inrolment Office, September*, 1846.]

Scientific Notices.

REPORT BY M. DE SILVESTRE, OF THE COMMITTEE OF ECONOMICAL ARTS, ON THE MANUFACTURE OF THE METALLIC PENS OF M. MALLAT.

[Translated from the "Bulletin de la Société d'Encouragement," for the London Journal of Arts.]

GENTLEMEN,—Although the invention of metallic pens dates about fifty years back, it is only within the last fifteen years that these pens have come into very general use, and, consequently, that their manufacture has acquired a degree of importance; in practice, however, many serious inconveniences have been found to arise from the nature of the substance of which they are composed, as well as from the processes employed in their manufacture. Thus, in a given quantity of metallic pens, a very small number, only, are made to suit the purchaser; for, in general, they work badly on paper, and quickly deteriorate when used; in consequence also of the little importance attached to the temper of these pens, many of them bend from want of sufficient temper, whilst others break from being too much tempered.

The means hitherto adopted to avoid these inconveniences has been, to offer a large produce for consumption at a very low price, in order, as much as possible, to decrease the loss arising from the number of ill-made and useless pens,—a means which is evidently inefficacious.

M. Mallat has proposed to introduce into the manufacture of metallic pens certain improvements, which would certainly increase their cost, but at the same time make them infinitely better and more durable.

The nibs of M. Mallat's pens are not obtained by one stroke of the punch. Each pen is composed of several parts, which, from the nature of the substances employed in their composition, are equally invulnerable to exterior agents: these different parts are, the nibs, the stem or barrel, and the points.

The two nibs, manufactured separately by the machine, and then connected by means of the stem, are formed from an alloy of gold, platinum, silver, and copper, in such proportions that, though retaining the appearance of the gold, they combine, with the unchangeability of this metal, the most perfect elasticity.

The stem or barrel, on which the nibs are rivetted, is composed of platinum and silver.

M. Mallat employs, in the construction of the points of the nibs, the ruby, and another still harder substance, called *osmiuret of iridium.* This alloy, in the granular state as obtained from the platinum ore, is soldered to the extremity of each nib, and is ground to the desired form by means of emery and diamond dust. The *osmiuret of iridium,* on account of its extreme hardness, completely resists the action of the Turkey stone, which is commonly used among jewellers.

As regards the ruby points, they are firmly fixed to the extremity of each nib, and then ground by the ordinary process.

The assiduity with which M. Mallat has conducted his manufacture for several years, has led to the most satisfactory results; for, in addition to his pens being composed of inoxydizable substances, which assures them great durability, their points are always smooth, which facilitates their use on all sorts of paper; the consumer has therefore merely to choose a pen of a suitable degree of hardness.

Finally,—the best testimony which the Committee of Economical Arts can furnish, in proof of the eulogium which they deem worthy to bestow on M. Mallat, is the number of orders and sales entered in his books. These entries serve to shew the progress of his manufacture, and consequently the estimation in which his productions are held. During the first year, 1843, M. Mallat delivered for consumption nearly fifteen hundred pens; the second year this number increased to about two thousand five hundred; the third arose to five thousand; and in the present year, 1846, M. Mallat anticipates a demand for ten thousand pens, and yet each pen cannot be sold under six francs. I may add, that M. Mallat is the inventor of several machines which are essential to his manufacture, and which are highly creditable to his ingenuity.

NEW SACCHARIMETRIC PROCESS.

BY M. EUG. PELIGOT.

THE author communicated to the Society of Encouragement, in its sitting of the 15th April last, a process of assaying crystallized sugar as well as syrups, by means of lime.

This process, which is applicable to sugar, in a solid or crystallized state, such as raw sugar, as well as to liquid sugar, whatever be its nature and origin, requires no other instruments or re-agents than those which are found in all manufactures, and no more skill than is necessary to make an alkalimetric assay. It is based upon the action, essentially different, which alkalis exercise over the two sorts of sugar, the ordinary cane or beetroot sugar, and the glucosus, or sugar from starch, raisins, and fruits.

The ordinary sugar combines with alkalis, and forms, with the bases, or chief ingredients, compounds in defined proportions, from which the sugar may be extracted without having suffered the least alteration.

The glucosus also combines with alkalis; but it produces compounds of so volatile a nature, that it is impossible to preserve them for more than a few moments. In fact, if a solution of glucose and potass be left to itself, at the ordinary temperature, the quantity of free potass contained in the liquor is observed to diminish every day, and eventually disappears entirely where the glucose is employed to excess. The glucose transforms itself, in effect, into one or more acids, which give to the liquor a brown color, and form, with the potass, neutral salts.

The action slowly exercised by the alkalis over the glucose, at the ordinary temperature, developes itself instantaneously on the solution of these bodies being boiled; in a few minutes, the transformation of the glucose into these acids takes place in a complete manner.

The alkali used by M. Péligot, for his saccharimetrical assays, is lime. It is known that pure water dissolves only a thousandth part of its weight of lime, whilst saccharine water dissolves a considerable quantity, in proportion to the weight of sugar which it contains.

To make an assay of raw sugar, 10 grammes of this sugar are weighed and dissolved in 75 cubic centimetres of water; to this solution is added, by degrees, 10 grammes of slack lime, sifted and prepared in a glass or porcelain mortar, and beaten for about eight or ten minutes; then the mixture is passed through a filter to separate the undissolved lime, the chief ingredient having been employed to excess.

It is adviseable to pass the liquor a second time through the filter, in order to be able to dissolve the whole of the lime which combines with the sugar. Then take, with a graduated measure, 10 cubic centimetres of the solution of saccharate of lime, diluted with from 8 to 10 decilitres of water; then pour into this liquor a few drops of blue litmus, and saturate it with a solution of sulphuric acid. A quart of this proof liquor contains 21 grammes of sulphuric acid to 1 equivalent of water. A quart of this liquor will saturate the quantity of lime dissolved by 50 grammes of sugar.

The first solution of sulphuric acid is introduced into the alkalimetric assay vessel, or into a vessel graduated to cubic centimetres, each of which is divided into 10 parts. This vessel being filled up to zero, the acid liquor is poured into the alkaline solution, which is kept in agitation until the blue tint of the latter turns to red, under the influence of the last drops of the proof liquor.

By observing, on the divisions of the vessel, the quantity of pure acid which it was necessary to employ to attain this point of saturation, the quantity of lime and likewise of sugar contained in the solution of saccharate of lime is given:—the total contents of this solution is also known, by means of M. Payen's table for estimating the volume produced by specific weights of sugar and water.

For the ordinary raw sugars, destined for refining, the assay stops here; but it often happens that it is adulterated with *glucose*. In order to detect this fraud, and likewise to analyze the molasses and the sugars of inferior quality, proceed at first in the manner indicated for raw sugars

After the first alkalimetric assay, introduce into a medicine phial a portion of the alkaline liquid, heated to 100 degrees, in a vessel of hot water, for several minutes. If this liquor contains only the saccharate of lime, produced by the ordinary sugar, it becomes troubled by the action of the heat, owing to the property possessed by this calcareous compound, of coagulating when heated to 100 degrees; but this agitation ceases by the cooling of the liquor, which does not assume a deeper tint than before it was heated. In submitting it to a second alkalimetric process, after it has cooled, it returns to its primitive state.

But if the saccharine produce contains glucose, the solution heated by the hot water assumes a brown tint, and it leaves a brown deposit, which does not disappear after its cooling. If the glucose is in large quantity, it throws out a decided smell of burnt sugar. Lastly, the second alkalimetric assay gives a less quantity of lime than the first; this quantity appertains entirely to the ordinary sugar, the lime dissolved cold having produced neutral salts, on which the pure liquor of sulphuric acid has no action.

When heating pure glucose, the first alkalimetric assay, after the lime has been ground with the liquid in a cold state, would produce nearly the same alkaline proportions as ordinary sugar; the second assay, made with a portion of the liquor, heated to 100 degrees, would produce the same quantity of lime as that which was dissolved by an equal volume of pure water. This quantity is very small, and will saturate 4 cubic centimetres of the pure solution of sulphuric acid per decilitre.

Although the liquor assumes a brown tint, the point of saturation may be easily determined by adding thereto a little more litmus, and stopping immediately the solution, which has become of a greenish tint, assumes a clearer hue by the addition of sulphuric acid.

The assaying of saccharine liquids is carried on in the above manner; it is only necessary to have the precaution to operate on liquors marking 6 or 8 degrees on the areometer of Beaumé.

The juice of beetroot and sugar possess these properties. The quantity of slack lime employed in these liquids should be almost equivalent to the presumed quantity of sugar in the produce to be assayed: this quantity is shewn approximatively by the areometric degree of the liquor.

REPORT MADE BY M. DUMAS, OF THE COMMITTEE OF CHEMICAL ARTS AT PARIS, ON A WORK OF M. J. PERSOZ, ENTITLED, "A THEORETICAL AND PRACTICAL TREATISE ON THE PRINTING OF TISSUES."

THE Society of Encouragement had offered a prize for the best treatise on the bleaching of tissues, and the manufacture of printed stuffs. Several years ago the sittings of the Society were discontinued, and the papers which had been received were deliberated upon, but none of these papers having been deemed worthy of the prize, the Society struck off this subject from their list.

However, one of our most skilful chemists, who was fortunately enabled to undertake and accomplish this difficult task, had devoted himself to it from the time that the Society's proposal was first made known; and although he was far from being satisfied with his work, when it was determined to withdraw the prize for this subject from the Society's programme, he thought it a duty he owed to the Society to persevere in the task which it had opened for him.

M. Persoz, Professor of Sciences, of Strasbourg, has now laid before you the result of his long and arduous researches, which he has combined in four beautiful volumes, accompanied by a specimen book of the most elaborate execution.

M. Persoz was born amongst the manufactures of printed calicoes; he passed the whole of his life in this occupation; and being fortunately situated in Alsace, in the very centre of our manufactories of printed calicoes, for the purpose of giving instruction in chemistry, every assistance was thus afforded him.

His work embraces every detail of this branch of industry; and his personal opinion is given, even in the midst of the most accurately collected information, and wisely discussed opinions; for such is the right of every author who has practised everything by himself, and who relies upon his own experience in all things.

Two volumes are devoted to the subject of coloring matter, the theory of dyeing, and the various processes of printing in colors, and also the nature and effect of the various machines used in this branch of industry.

Two other volumes contain an accurate description of all the processes of printing which are practised upon cotton and other stuffs of a similar description.

To each receipt is added a sample of the stuff, which gives the reader a faithful representation of the effect produced by the ingredients.

These samples, several hundred in number, exhibit the state of the art in all countries; for Alsace, Switzerland, Normandy, the environs of Paris, and England, and Scotland, have vied in liberality towards the author. He has received from the principal manufactures pieces of the stuffs, which, being cut into samples, are invaluable models to the reader.

By simple, new, and rapid processes, the author enables each manufacturer to define, himself, with great accuracy, the exact nature of the processes used for producing any color on a given fabric. This system of assay, from its precision and importance, does honor to the intelligence of M. Persoz, and will render the greatest services to the trade.

The Society has deemed it right to award to the author of this remarkable work a recompense in accordance with the services which it is calculated to render, and has therefore voted him a medal of the value of 3000 francs.

Desirous, however, of giving to the author and editor, whose zeal for the publication of this elaborate work is worthy of all praise, a further testimony of its great satisfaction, the Society has decided in adopting this treatise as the head of the collection of which they propose to favor the publication. In consequence of which the editor is authorized to place at the head of his work, a general title, bearing the following words:—"Library of the Manufacturing Arts, published under the auspices of the Society of Encouragement of National Industry and Chemical Arts."

Lastly.—The Society has decided on awarding this work as a prize to the various foremen in the manufactories of printed calicoes or other fabrics, who shall have merited this distinction.—[Might not the proceedings of this Society be copied with advantage in England.—Ed.]

EXPLOSIVE COTTON.

At the recent meeting of the British Association at Southampton, a considerable sensation was caused by the exhibition of a preparation of cotton, which was said to possess inflammable and explosive qualities, greatly superior to gunpowder. A small portion of this cotton, on being placed upon a sheet of writing-paper, was ignited by a heated wire, and produced a very considerable flame and powerful explosion without smoke, and left no appearance of soot or discoloration on the paper.

The particulars of this new preparation are, for the present, kept a profound secret by the inventor, Professor Schoenbein, of Basle, who, it is said, intends to protect his discovery by patent; it would, therefore, be improper to speculate upon the chemical means by which such important results have been obtained. Cotton is already known to possess some very extraordinary electrical and combustible properties, and to some of these, perhaps, in combination with certain highly inflammable chemicals, are to be attributed the extraordinary effects exhibited before the Society. May not cotton—a combination of vegetable hairs—be a better vehicle for the ignitible properties or ingredients forming gunpowder than the earthy and charred vegetable particles, which must be a hindrance to the sudden and perfect combustion of the inflammable matters?

ON TWO EXTRAORDINARY METEORS.

BY PROFESSOR ELIE WARTMANN.

I observed a few months ago two meteorological phenomena, which I consider to be of very unfrequent occurrence. The first is *an extraordinary rainbow*, which was seen on the 25th of last April, during a partial eclipse of the sun. I was at Paudex, a little village on the shore of the lake of Geneva, nearly two miles east of Lausanne. The sky, which was cloudy in the morning, cleared up in the afternoon. A single band of cumulo-strati, at a slight elevation, rested on the ridge of the Jura, in the west, where, half concealing the sun, it received from it a golden light, scarcely supportable by the eye, and which prevented the observation of that luminary. Towards 5 o'clock a double iris was perceived, presenting the usual interior and exterior arcs; the first accompanied by six exterior supernumerary bands, red, green, red, green, reddish, pale green. At this moment there was no rain between the sun and my eye, and the surface of the lake was smooth as a mirror; but a hard shower fell upon the rocks of Meillerie, situated on the opposite shore, and veiled their summits. By degrees the nimbus or rain-cloud went off to the S.S.W. I returned home in the direction of the sun; then, after a few minutes, wishing to examine again the rainbow, I no longer observed any secondary bands, nor the two concentric arcs above mentioned. A brilliant column of the brightest colors was formed over the lake, which appeared to penetrate to its bottom. This column was violet on the side of the sun, and was *double the width* of the ordinary interior arc. It rose, dome-shaped, to from nine to ten degrees, then it branched out into two distinct arcs, which left between them a dark space similar to a spherical angle of about six degrees aperture. (I had no instrument with me, and I only give these as approximate estimations.) The inferior arc was the ordinary interior one; it was more brilliant and more developed than the upper one, which merged gradually in the general light, and had also the red outwards. At the limit of the wide band, in which the two partial arcs originated, the colors sparkled so that it was impossible to determine the spot where the separation of the tints between the two arcs took place. The development of these various phases commenced at a quarter to six o'clock; the last continued eight to ten minutes, and all vanished some instants before sunset. Mr. Frederick Chavannes, mathematical instructor in the Gymnasium of Lausanne, and Member of the Society of Natural Sciences in that city, witnessed this phenomenon, and agreed in describing it as I have done.

Does this extraordinary excentric arc proceed from a second illuminating point placed at the same height as the sun, or from a very resplendent nubilous band? I am inclined to think that it is produced by the reflection of the luminous rays on the surface of the lake. This circumstance, in diminishing their intensity, must have caused all trace of the external arc to disappear. The little height of the excentric above the common arc will be explained, on this hypothesis, by the short distance of the luminary from the horizon. Lastly, we may compare the appearance of which I have spoken to that of other bows which have been observed in analagous circumstances, such as that of the 10th of August, 1665, observed by the Canon-Etienne on the banks of the Eure, near Chartres; that of the 17th of August, 1698, which was observed by Halley, at Chester, in the vicinity of the Dee; that of the 8th of August, 1743, so well described by Celsius, who witnessed it at Husbi, in Dalecarlia, on the left bank of the Dale, &c. All these meteors, and that of the 25th of April, occurred between the hours of six and seven in the evening. But the very regular spectral coloration of the portion common to the two arcs has still to be accounted for. The cause of its being more brilliant than the rest is explained by the superposition of the refracted rays in relation to the observer; but how are the two partial spectres expanded so as only to form one of twice the width?

The second meteorological phenomenon was seen in all its beauty on Saturday, the 30th of May last. The Bise had blown the whole day, and not a vapour obscured the perfect clearness of the sky. The moon was only five days old. Shortly after sunset I remarked, and pointed out to several persons who were with me, a very luminous band, of that deep red which sometimes tinges the clouds in the west. It was single, vertical, and about 35° high. It presented no appearance of divergence; on the contrary, its sides, exactly parallel, were distant 1½° to 2°. It rested on the perfectly defined ridge of the Jura, near the spot were the sun went down. From this inferior limit, its brilliancy remained sensibly constant (in reality it diminished with the height, but the decreasing clearness in the atmosphere compensated this diminution of visibility) up to an elevation of about 25° above the horizon; still higher the red tint diminished rapidly in intensity, and finally merged in the blue of the sky, without its being possible to determine exactly this upper limit. It was exactly a quarter to eight o'clock when I made this observation; the sun had disappeared eight to ten minutes before. Possibly the band existed some instants before I perceived it. It continued to be visible for more than forty-five minutes, moving towards the north, as the sun did, but without ceasing to *appear* vertical, without inclining perceptibly toward the horizon; only it diminished progressively in brilliancy, and consequently in length.

This phenomenon was remarkably splendid, and excited the admiration of a great number of persons. Dr. H——, shewing it to his son, exclaimed, "Look! there is the pillar of fire that shone by night in the camp of the Israelites!" At Aigle, east of Lausanne, people thought that the chief town was in flames.

From a rapid survey of the polar star, I found that this light was 50° west of the geographical meridian. Its dependence on the sun, its distance from the magnetic meridian, and the absence of abnormal perturbations in the magnetometer, remove any idea of an aurora borealis. On the other hand, the very decided parallelism of its lateral borders on an extent of 35°, places this phenomenon out of the class of ordinary crepuscular rays. It is distinguished from those which were particularly investigated by M. L. A. Necker, by its appearance after sunset, by the absence of dark bands on its right and left, by its gigantic dimensions, and lastly by its character of constant width and solitude. If the point of view from which it was observed took from it the illusory appearance of divergence of the crepuscular rays, it seems necessary to attribute its production to other causes than the clouds, to which that able geologist and mineralogist attributed the common origin of these rays.

The following day, May 31, this same light was visible, but very feebly. The sky, although clear, had not the rare transparency of the preceding evening. The sun disappeared at about twenty-five minutes past seven; the band was seen towards ten minutes past eight, 7° more to the north than the point of setting, and traversed about 2° in five minutes. Various accounts which I have received agree in tracing back the first appearance of this phenomenon to the middle of last April. The 21st of May is stated as the day when the meteor was visible for an hour and a half. On the 23rd, the sky was very clear, the air calm, the meteor less brilliant than the evening before; it was seen suddenly on the horizon at a quarter past seven, and did not disappear till thirty-five minutes past eight. Lastly, on the 28th, the Bise was strong, and fleecy clouds were perceived around the luminous band, which lasted until forty-two minutes past eight. It appears certain that it was always seen single, vertical, and with parallel edges.—*Philosophical Journal for September.*

REPORT OF AMERICAN PATENTS.

BY MR. C. M. KELLER.

From the "Journal of the Franklin Institute."

To Nicholas P. Isaacs *and* James Raisbeck, *of New York, for an improvement in ships' anchors.*

The object of this improvement is to prevent the fouling of the cable upon the stock and arms of the anchor, which, in the present mode of making anchors, is attended with much inconvenience.

Claim:—"These additions and modifications to and about the common ship anchor, and their application, for the purposes herein minutely described, are improvements which we claim to be of our own invention, which are briefly enumerated as follows:—

"1st. The method by which the cable is prevented from fouling upon the stock of the anchor, by attaching protectors to the extremities thereof, which extend down and are fastened to the shank at a point below the trend of the shank. These protectors, from their oblique position, clear the cable whenever it touches it. They also obviate another difficulty, which is frequently presented when the anchor is lashed to the cathead, which prevents the entangling of the ropes, and the obstructing and tearing of the sails upon the portion of the naked stock which stands above the gunwale; this is prevented by warding off whatever comes in contact with it.

"2nd. The mode of protecting the arms of the anchor against the fouling of the cable, by means of moveable plates of metal attached to the flukes by means of rings, or hinges, and covering the entire arm, the same being combined and operating as herein set forth. The inner ends of these plates move longitudinally upon ridges or projections made upon each side of the shank by means of a connecting chain or rope, by which, when the one plate is forced down upon the arm of the anchor, the other is drawn up to a position at right angles, or nearly so, with the shank; so that when the arm lies buried in the soil, the opposite one stands defended by the raised plate against the fouling of the cable; which plate assumes a position nearly perpendicular to the soil.

"3rd. We also claim, for clearing the cable from off the arms of the anchor whenever it comes in contact with it, the combination of the hinged sliding plates with the two guards of the same curvature of the arms and crown, consisting of narrow strips of iron, extending from fluke to fluke, and welded upon the sides of each. These guards are also attached to the crown of the anchor, by means of a short shoulder, leaving a space between them and the arms of the anchor.

"These guards, so situated, create a great width across the crown of the anchor, presenting an enlarged and curved form, by means of which width, and the curvature of the guards, it is impossible to foul the cable effectually upon the arms, and it requires but the smallest force to cause the anchor to cant and bite the ground. The space left between the guards and arms presents a means by which the fish-hook can be fastened about the guards or arms in such a manner as to fish the anchor."

To JOSEPH D. BRIGGS, *of Saratoga Springs, New York, for an improvement in the corn-sheller.*

THE ears are shelled in this machine by spurs projecting from the face of a wheel in connexion with a toothed plate having a flanch on each edge, and a partition above the line of the shaft, so that the ears of corn are first acted upon in descending, and as they are carried below the shaft the rotation of the wheel carries them around and up on the other side of the shaft, and out at top, the partition preventing the cob and shelled corn from passing into the first division.

Claim:—"What I claim as my invention, and desire to secure by letters patent, is the contrivance, as above set forth, for raking the ear on both sides of the centre—first down and then up. The arrangement for this purpose of the flanches, and their combination with the spurs of the wheel, I claim and wish patented."

To HARRISON HAGAUS, *of Brandonville, Preston county, Virginia, for improvements in the washing machine.*

IN this washing machine the bottom of a box is provided with a fluted concave, on which the clothes are rubbed by a convex fluted rubber, which slides up and down in a small box, hung to vibrating arms. The clothes to be washed are put in this vibrating box and pressed on to the fluted concave by the fluted rubber. There is a hole in the fluted rubber with a valve, by means of which any part of a garment can be held below to be acted upon by the rubber and concave, whilst the rest is above the rubber.

The claim is limited to the combination of the vibrating box and fluted concave; and also to the employment of the valve or shutter in the fluted rubber, in combination with the fluted concave.

To Edward Clark, *of Brooklyn, New York, for a composition of printers' ink.*

Claim:—"What I claim as my discovery, and the advantages of which I wish to secure to myself and my legal representatives, by obtaining letters patent, is the admixture or combination of coalaphane, either with asphaltum, or rosin, or pitch, or turpentine, or balsam, or prepared linseed oil, or caoutchouc, or with any of the materials known as resins, gum-resins, and bitumens, or with any two or more of them, and with lamp-black, or Frankfort black, or other dark colored matter, in such due proportions as to form printers' ink; and the proportions before given varied by the judgment of the manufacturer, according to the consistency of the mixed materials used, will be found to effect the object."

To Robert Hare, M.D., *of Philadelphia, Pennsylvania, for improvements in the compound hydro-oxygen, or hydrostatic blow-pipe.*

Claim:—"What I claim as my improvement on the hydro-oxygen blow-pipe, and in the processes for supplying this instrument with gas, and desire to secure by letters patent, is as follows:—

"In the first place, I claim the employment of more than one jet pipe, or several jet pipes, so associated as to produce a large flame by the combination of several smaller flames or jets; or of one jet pipe, so crammed with coarse wire as to cause the gaseous mixture to escape into the air at the point of efflux in several jets, as already described, in lieu of one, as in using the instrument originally invented by me, and in all subsequent modifications prior to the one for which I now desire a patent; for, although in the concentric pipes used first by me, and afterwards by Daniells and Maugham, the hydrogen escaped from the pipe so as to mingle with the oxygen passing out through another, still more than one pipe or one aperture yielding one jet was not used for the efflux of the mixture of the two gases employed. Moreover, although tubes, crammed with fine wire, have been employed as safety-tubes, to prevent the retrocession of the flame, coarse wires have never been heretofore used to cram the tube at the point of efflux, so as to divide the gas at the place of inflammation.

"I also claim the employment of a jet, which may be made from between two flat surfaces, whether channeled or not, or, in other words, from a fissure or keef, or row of holes, as set forth.

"I likewise claim the refrigeration of the jet pipe or pipes, by passing it or them through a case or box filled with water or other refrigerating substances, as heretofore described.

"I claim, also, the employment of a vessel provided with a tray and rod, like that last described, in combination with another vessel of the same capacity, of which the bottom is above the middle of that first mentioned,—both vessels communicating by means of adequate pipes and cocks, so that the gas may pervade both simultaneously; or, by shifting a cock, may be prevented from reaching the additional vessel: after which, the acid being driven into the second vessel, its contact with the zinc is prevented or diminished, as more fully made intelligible by the description.

"I further claim the employment, for the suppport of the platinum, of a brick of kaolin, or other infusible earth, resting on a platform so balanced on a point, or a ball, or in any other way, as to be kept horizontal by attaching to it a weight, and supported by a lever turning on a universal joint, and as heretofore described.

"I claim, also, the employment of any variety of carburetted hydrogen for the fusion of platina, in lieu of hydrogen, in the apparatus above described."

To SAMUEL R. WARREN, *a citizen of the United States, residing in Montreal, Canada, for an improvement in the piano-forte.*

The patent says:—"Any number of keys or hammers are connected together by coupling levers, so that the striking of any one key shall, by means of the coupling lever, strike the note of its octave, and the coupling is so arranged that the parts striking the octaves are thrown out of action at pleasure. The inventor does not intend to limit the application of his invention to the production of octaves, but to adopt it to any other series of notes, as taste may require."

Claim:—"What I claim in the above as my invention, is the combination of a coupling lever, which, together with its support, is capable of being moved up or down, or not, as the case may require, and its wires and regulating buttons or nuts, and a lever, and auxiliary hopper or fly, (or other substitutes of like character,) applied to any two keys or key levers of a piano-forte, for the purpose of sounding the strings of both keys by striking upon one of the keys, as above described.

"And I also claim the combination with the hopper which is applied to the key levers, for the purpose of elevating the parts above, and the hammers of the vibrating bar or apparatus, by which said hopper is thrown out of action, upon the parts above it,—the same being for the object or purpose as herein before speicfied.

"And I also claim the mechanism of combination, by which

I am enabled at pleasure to effect the action of a key above or below the key struck by the performer, the said mechanism consisting in the moveable board, made capable of being raised or lowered by pedal levers, and the respective regulating buttons or nuts of the keys; the said nuts being arranged upon their wires, and the whole of the said mechanism being operated and applied to the other parts of the action, substantially as described."

To J. PARSONS OWEN, *of Cincinnati, Ohio, for an improvement in the machine for making bricks.*

THE patentee says:—"The nature of my invention consists in so arranging the moulds in a reciprocating carriage, placed between two pressure rollers, as to subject the clay in the moulds to the pressing action of the rollers, first in one and then in the reverse direction; and also in combining with the reciprocating carriage of moulds, two hoppers, placed one on each side of the upper pressure roller, to supply pulverized or tempered clay."

Claim:—"What I claim as my invention, and desire to secure by letters patent, is the combination of the reciprocating carriage with the pressure rollers, in the manner described, so as to give the pressure both ways, in the manner set forth, by which brick is made either from crude clay pulverized, or sand or slop brick is manufactured."

To ROYAL C. GRANT, *Pomeroy, Meigs county, Ohio, for an improvement in the current or tide water-wheel.*

THIS is a mode of arranging the wheel, so that it can rise and fall with the tide, and still communicate power, by means of a cog chain which takes into the teeth of a cog wheel on the shaft of the wheel, and another cog wheel above and below, so that the motion will be communicated, notwithstanding the movement of the shaft of the wheel up and down.

Claim:—"What I claim as my invention, and desire to secure by letters patent, is the combination of a water-wheel, which rises and falls with the current or tide, with an endless chain and pulleys, in the manner and for the purpose above specified."

LIST OF REGISTRATIONS EFFECTED UNDER THE ACT FOR PROTECTING NEW AND ORIGINAL DESIGNS FOR ARTICLES OF UTILITY.

1846.

Aug. 31. *William & Henry Shaw*, of Dublin, for the Polenta pot.

31. *Thomas Smith*, of 1, Regent-street, City-road, for a tea mill or breaker.

Sept. 1. *Charles Slatter*, of 2, London-street, Fitzroy-square, for an improved landau or landaulet pillar joint.

Sept. 2. *Andrew Lamb*, engineer to the Oriental and Peninsular Steam Company, Southampton, for a self-acting blow-off apparatus and refrigerator.

2. *Herbert Spencer*, of 16, Albert-terrace, Bishop's-road, Paddington, for a binding pin.

2. *George Jennings*, of 29, Great Charlotte-street, Blackfriars-road, for a shutter fastener.

3. *M. Ulric Debeaune*, of No. 4, Wellington-street South, Strand, London, for an aspirator for mill-stones.

5. *Holland & Co.*, of Godalming, for a new shape for drawers.

7. *A. & R. Thwaites & Co.*, of 57, Upper Sackville-street, Dublin, for a Carrara water bottle.

7. *John Paintin & Henry Ingram*, of Stoke Prior, for a machine for cutting soap.

9. *William Petrie*, of King-street, Portman-square, London, for the Apostadometer.

9. *William Pierce*, of 16, Victoria-terrrace, Dudley, for a letter copying machine.

14. *John Talbot Ashenhurst*, of Upper John-street, Fitzroy-square, for an adjustable support for book-case and other shelves.

14. *Richard Bright*, of 37, Bruton-street, for a lamp chimney and holder.

14. *Edwin Shelton*, of Thorngrove, near Worcester, for a root-washer.

16. *Holtzapffel & Co.*, of Long Acre, for a pen for enfeebled hands.

16. *Thomas Reynolds*, of Cheltenham, for a travelling protector.

16. *Joseph Cooper*, of 12½, Bolingbroke-row, Walworth, for a double supporting brace.

17. *Thomas Reynolds*, of Cheltenham, for a brace.

17. *Joseph Stenson*, of Luton, Beds, for a double glass-holder for an oil lamp.

18. *John Pattinson*, of Bishop Wearmouth, in the county of Durham, for an improved revolving wood shutter.

19. *James Stewart*, of 3, Gloucester-crescent, Regent's-park, London, for an instrument for facilitating the holding of a violin by the chin of the performer.

Sept. 21. *Alexander Robertson*, of 22, Bachelor's-walk, Dublin, for the gum elastic syphonan.

21. *Robinson & Bussell*, of 7, Westmorland-street, Dublin, for Bradshaw's British valve.

22. *Thomas Grubb*, of Dublin, for an improved brass for the pockets of billiard tables.

22. *Thomas Edwards*, of 24, Gough-street, Birmingham, for an improved octagon cigar-case

22. *Joseph Brown*, of 37, Minories, London, for a self-adapting foot and leg rest, for recumbent chairs and seats.

23. *Butler Brothers & Whitehouse*, of Walsall, for a cigar-case.

24. *Alfred Earnshaw*, of 5, Hall Carr Place, near Sheffield, for the castrating knife.

24. *W. & C. Wynn & Co.*, of Suffolk-street, Birmingham, for an awl haft.

List of Patents

That have passed the Great Seal of IRELAND, from the 21st August, to 21st September inclusive.

To George Hinton Bovill, of Millwall, in the county of Middlesex, engineer, for improvements in manufacturing wheat and other grain into meal and flour.—Sealed 24th August.

Richard Whytock, of Edinburgh, manufacturer, (a renewal for five years, from the 15th August, 1846, of a former patent,) for an improved method or manufacture which facilitates the production of regular figures or patterns on different fabrics, particularly velvets, velvet pile, and Brussels, Wilton, and Turkey carpets.—Sealed 24th August.

Robert Hazard, of Clifton, near Bristol, in the county of Somerset, confectioner, for improvements in apparatus for heating public and private buildings.—Sealed 24th August.

William Garnett Taylor, of Halliwell, in the county of Lancaster, cotton spinner, and William Taylor, of the same place, labourer, for improvements in consuming smoke and economising fuel.—Sealed 31st August.

John Paterson Reid, of the city of Glasgow, and county of Lanark, in North Britain, Gent., and Thomas Johnson, of the same place, mechanic, for certain improvements in machinery for weaving, and for producing patterns in weaving; as also in machinery for finishing certain woven fabrics.—Sealed 11th September.

John Robert Johnson, of Alfred-place, Blackfriars, in the county of Surrey, chemist, for improvements in the materials employed in constructing and working atmospheric railways.—Sealed 16th September.

John Simson, of Riches-court, Lime-street, in the city of London, merchant, for certain improvements in machinery for preparing and spinning flax and other fibrous materials.—Sealed 19th September.

List of Patents

Granted for SCOTLAND, subsequent to August 22*nd*, 1846.

To William Nicholson, of Manchester, in the county of Lancaster, engineer, and George Wadsworth, of Sutton Glass Works, in the same county, manager, for certain improvements in the manufacture of glass and other vitreous products.—Sealed 2nd September.

Moses Poole, of the Bill Office, London, Gent., for improvements in treating vegetable fibres, to render them applicable to the manufacture of paper,—being a communication from abroad. —Sealed 2nd September.

James Warren, of Montague-terrace, Mile End Road, in the county of Middlesex, Gent., for improvements in the manufacture of cast screws.—Sealed 2nd September.

John Spenceley, of Whitstable, in the county of Kent, master block-maker, for improvements in the construction of ships and other vessels; and also improvements in apparatus to be attached to ships and other vessels.—Sealed 3rd September.

Frank Hills, of Deptford, in the county of Kent, manufacturing chemist, for a method or methods of treating certain gases, and manufacturing sulphuric acid, muriatic acid, acetic acid, and certain salts of potash.—Sealed 3rd September.

Robert Nisbet, of Lambden, in the county of Berwick, Esq., for certain improvements in locomotive engines and railways.—Sealed 4th September.

Frederick Crace Calvert, of Paris, in the Kingdom of France, chemist, for improvements in the preparation of the article called "jute," rendering the same applicable for various useful purposes.—Sealed 9th September.

Charles Dowse, of Camden Town, in the county of Middlesex, Gent., for improvements in the manufacture and finishing of fabrics, capable of being used as substitutes for paper.—Sealed 11th September.

James William Bowman, of Great Alie-street, Goodman's Fields, in the county of Middlesex, sugar refiner, for improvements in reburning animal charcoal.—Sealed 21st September.

Alfred Vincent Newton, of the Office for Patents, 66, Chancery-lane, London, in the county of Middlesex, mechanical draughtsman, for certain improvements in machinery for manufacturing screws,—being a communication from abroad.—Sealed 21st September.

New Patents

SEALED IN ENGLAND.

1846.

To Henry Bessemer, of Baxter House, Old Saint Pancras road, engineer, for certain improvements in railway engines and carriages; parts of which improvements are applicable to the propelling of steam vessels, and to motive purposes generally. Sealed 26th August—6 months for inrolment.

Alfred Krupp, Principal of the House of Frederick Krupp, of Essen, in the Kingdom of Prussia, but now of Leicester-square, Middlesex, for certain improvements in the manufacture of spoons, forks, and other similar wares, and in the machinery or apparatus employed therein; parts of which are also applicable to other manufacturing processes. Sealed 26th August—6 months for inrolment.

Thomas Wroughton, of Eltham-place, Kennington, Surrey, Gent., for certain improvements in apparatus and instruments for ventilation and respiration. Sealed 26th August—6 months for inrolment.

Richard Clarke Burleigh, of the city of Bath, in the county of Somerset, Gent., for certain improvements in artificial light. Sealed 28th August—6 months for inrolment.

Arthur Howe Holdsworth, of Brook-hill, Dartmouth, in the county of Devon, Esq., for improvements in buoys, and giving buoyancy to boats. Sealed 29th August—6 months for inrolment.

James Boydell, of Oak Farm Works, near Dudley, iron master, for improvements in applying apparatus to carriages to facilitate the draught. Sealed 29th August—6 months for inrolment.

William Air Foster, of Glasgow, leather merchant and boot-maker, for an improved mode of making belts for driving machinery, traces, reins, and other articles of leather, felt, or parchment, and for an improved apparatus or machinery for the same. Sealed 29th August—6 months for inrolment.

Alexandre Debain, of Paris, manufacturer, for certain improvements applicable to keyed musical instruments. Sealed 29th August—6 months for inrolment.

James Roose, of Darleston, in the county of Stafford, tube manufacturer, for improvements in the manufacture of welded iron tubes. Sealed 29th August—6 months for inrolment.

Henry Henson, of Hampstead, Middlesex, Gent., for certain improvements in railways and railway-carriages, having for their object the better accommodation and security of the public. Sealed 31st August—6 months for inrolment.

Frederick Henry West, of the City-road, Middlesex, for certain improvements in securing corks in bottles, jars, and other vessels, to contain liquids and other matters; and also improvements in such bottles and other vessels. Sealed 31st August —6 months for inrolment.

James Warren, of Montague-terrace, Mile-End-road, Gent., for improvements in the manufacture of cast screws. Sealed 31st August—6 months for inrolment.

James Coles, of Harley-street, Cavendish-square, Middlesex, surgeon, for improvements in apparatus for the prevention and treatment of distortions of the spine and chest; also for the treatment of diseases of the spine and other disorders where a recumbent position of the patient is required. Sealed 3rd September—6 months for inrolment.

Pierre Armand le Comte de Fontainemoreau, of 15, New Broad-street, city, for certain improvements in the machines for the manufacture of bricks and other plastic products,—being a communication. Sealed 3rd September—6 months for inrolment.

Nicholas Harvey, of Hayle Foundry, in the parish of Saint Erth, in the county of Cornwall, for certain improvements in filtering of water for steam-engines and boilers. Sealed 3rd September—6 months for inrolment.

George Senior, of Bradford, in the county of York, Gent., for certain improvements in washing, cleansing, scouring, and bleaching silk, cotton, wool, and fibrous substances generally; also in dyeing, combing, carding, spinning, felting, milling, or otherwise treating or preparing fibrous substances generally. Sealed 3rd September—6 months for inrolment.

Charles Ylery, of Rue Saint Lazare, Paris, engineer, for improvements in ascertaining and regulating the speeds and times of railway trains. Sealed 10th September—6 months for inrolment.

Moses Poole, of the Patent Bill Office, Gent., for improvements in treating vegetable fibres to render them applicable to the manufacture of paper,—being a communication. Sealed 10th September—6 months for inrolment.

Charles Richardson, of Dalston, in the county of Middlesex, Gent., for certain improvements in making and refining of sugar, and in the machinery and apparatus employed therein, —being a communication. Sealed 10th September—6 months for inrolment.

David Davies, of Wigmore-street, Cavendish-square, Middlesex, coach-maker, for certain improvements in steps for carriages, and other purposes,—being a communication. Sealed 17th September—6 months for inrolment.

William Edward Newton, of the Office for Patents, 66, Chancery-lane, Middlesex, civil engineer, for improvements in preserving fruit and vegetables,—being a communication. Sealed 17th September—6 months for inrolment.

Henry Wrigg, of Upper Holloway, Middlesex, civil engineer, for certain improved means or methods of diminishing draught and friction in carriages and other conveyances. Sealed 17th September—6 months for inrolment.

Henry Franklin, of Marstone Mortaine, in the county of Bedford, brick-maker, for improvements in the manufacture of bricks, tiles, and other like articles. Sealed 17th September—6 months for inrolment.

Frederick Brown, of Luton, in the county of Bedford, ironmonger, for improvements in ovens for kitchen ranges. Sealed 17th November,—6 months for inrolment.

William Bowman, of Great Alie-street, Middlesex, sugar refiner, for improvements in re-burning animal charcoal. Sealed 17th September—6 months for inrolment.

William Palmer, of Sutton-street, Clerkenwell, manufacturer, for improvements in the manufacture of lamps and candlesticks, and in gas and other pillars and pipes. Sealed 17th September—6 months for inrolment.

Richard Ford Sturges, of Birmingham, Britannia-ware manufacturer, for improvements in filtering apparatus, and in apparatus for making tea-pots and other vessels of metal. Sealed 17th September—6 months for inrolment.

Pierre Armand le Comte de Fontainemoreau, of 15, New Broad-street, in the city of London, for an improvement or improvements in the mode of manufacturing corks. Sealed 24th September—6 months for inrolment.

Alfred Vincent Newton, of the Office for Patents, 66, Chancery-lane, mechanical draughtsman, for improvements in the method of heating, hardening, and tempering various articles made of steel, or of iron and steel combined,—being a communication. Sealed 24th September—6 months for inrolment.

Charles Fox, of London Works, near Birmingham, in the county of Stafford, engineer, for improved machinery for shearing, cutting, and punching metals. Sealed 24th September—6 months for inrolment.

Edmund Nerot, of Lombard-street, Gent., for improvements in the manufacture of paper,—being a communication. Sealed 24th September—6 months for inrolment.

James Lamb, of Canal-road, Kingsland-road, Middlesex, for improvements in the manufacture of clogs. Sealed 24th September—6 months for inrolment.

Henry Deacon, of Eccleston, Lancashire, engineer, for improvements in the construction of flattening kilns. Sealed 24th September—6 months for inrolment.

Charles Chinnock, of Seymour-place, Little Chelsea, Middlesex, for improvements in folding and securing letters, envelopes, and covers. Sealed 24th September—6 months for inrolment.

Thomas Bartlett Simpson, of Islington, Middlesex, Gent., for certain improvements in propelling, and in machinery connected therewith. Sealed 25th September—6 months for inrolment.

CELESTIAL PHENOMENA FOR OCTOBER, 1846.

D.	H.	M.	
1			Clock after the ☉ 10m. 15s.
			☽ rises 3h. 45m. A.
			☽ passes mer. 9h 6m. A.
			☽ sets 1h. 18m. M.
	11	26	♃'s first sat. will im.
	10	37	♄ in conj. with ☽ diff. of dec. 6. 36. S.
2			Ceres stationary
2	19		☽ in Perigee
3			Occul. 21 Piscium, im. 8h. 43m. em. 9h. 50m.
3	20	11	♃'s second sat. will im.
4	10	6	Ecliptic oppo. or ○ full moon.
4	13	12	♅ in conj. with the ☽ diff. of dec. 2. 15. S.
5			Clock after the sun, 11m. 30s.
—			☽ rises 5h. 46m. A.
—			☽ passes mer. Morn.
—			☽ sets 6h. 40m. M.
5	0	51	♃ stationary
—			Occul. 54 Ceti, im. 13h. 3m. em. 13h. 49m.
	9	58	♅ in oppo. to the ☉
7	10	58	☿ in super. conj. with the ☉
8	13	19	♃'s first sat. will im.
9			Occul. 119 Tauri, im. 10h. 24m. em. 11h. 0m.
—			Occul. 120 Tauri, im. 10h. 52m. em. 11. 46m.
9	2	29	♃ in conj. with the ☽ diff. of dec. 3. 10. N.
10			Clock after the sun, 12m. 54s.
—			☽ rises 9h. 17m. A.
—			☽ passes mer. 4h. 20m. M.
—			☽ sets 0h. 15m. A.
	11	57	♃'s second sat. will im.
11			Occul. λ Geminorum, im. 10h. 56m. em. 11h. 41m.
12	4	8	☽ in □ or last quarter
14	18		☽ in Apogee
15			Clock after the sun, 14m. 6s.
—			☽ rises 1h. 16m. M.
—			☽ passes mer. 8h. 14m. M.
—			☽ sets 3h. 1m. A.
	15	13	♃'s first sat. will em.
	2	41	♀ greatest hel. lat. N.
16			Mercury R. A. 13h. 46m. dec. 10. 49. S.
—			Venus R. A. 12h. 30m. dec. 1. 42. S.
—			Mars R. A. 12h. 40m. dec. 3. 26. S.
—			Vesta R. A. 10h. 57m. dec 10. 47. N.
16			Juno R. A. 15h. 42m. dec. 9. 16. S.
			Pallas R. A. 0h. 25m. dec. 14. 0. S.
—			Ceres R. A. 4h. 13m. dec. 13. 18. N.
—			Jupiter R. A. 5h. 1m. dec. 21. 59. N.
—			Saturn R. A. 21h. 48m. dec. 14. 56. S.
—			Georg. R. A. 0h. 44m. dec. 4. 2. N.
—			Mercury passes mer. 0h. 8m.
—			Venus passes mer. 22h. 52m.
—			Mars passes mer. 23h. 0m.
—			Jupiter passes mer. 15h. 20m.
—			Saturn passes mer. 8h. 8m.
—			Georg. passes mer. 11. 4.
17	9	41	♃'s first sat. will im.
17	14	33	♃'s second sat. will im.
17	14	34	☿ in the descending node
18	16	10	♀ in conj. with the ☽ diff. of dec. 3. 10. N.
	18	6	♂ in conj. with the ☽ diff. of dec. 2. 21. N.
19			☉ eclipsed, invis. at Greenwich
20			Clock after the sun 15m. 4s.
—			☽ rises 6h. 38m. M.
—			☽ passes mer. 11h. 53m. M.
—			☽ sets 5h. 0m. A.
	7	44	Ecliptic conj. or ● new moon
	7	45	♀ in conj. with ♂ diff. of dec. 0. 43. N.
	12	51	☿ in conj. with the ☽ diff. of dec. 1. 5. S.
22	17	7	♃'s first sat. will im.
24	11	35	♃'s first sat. will im.
24	17	10	♃'s second sat. will im.
25			Clock after the ☉ 15m. 46s.
—			☽ rises 11h. 46m. M.
—			☽ passes mer. 4h. 13m. A.
—			☽ sets 8h. 43m. A.
27	3	10	☽ in □ or first quarter
27	18	17	☿ in Aphelion
28	17	7	♄ in conj. with the ☽ diff. of dec. 6. 36. S.
	19	48	♄ stationary
30	13	26	♃'s third sat. will im.
30	15	42	♃'s third sat. will em.
30	16		☽ in Perigee
31	13	9	♃'s first sat will im.
31	21	19	♅ in conj. with the ☽ diff. of dec. 2. 21. S.

J. LEWTHWAITE, Rotherhithe.

THE

LONDON JOURNAL,

AND

REPERTORY

OF

Arts, Sciences, and Manufactures.

CONJOINED SERIES.

No. CLXXIX.

RECENT PATENTS.

To Thomas Robinson Williams, *of Love-lane, Aldermanbury, in the city of London, Gent., for a new or improved preparation and manufacture of certain fibrous and other materials, for the production of a fabric suited, among others, to the purposes for which horse-hair seating and horse-hair cloths are usually employed.*—[Sealed 7th April, 1845.]

This improved preparation and manufacture of certain fibrous and other materials consists in a mode of preparing fibrous materials by saturating and coating them with certain peculiar kinds of composition or varnish, in order that, when so treated, they may resemble horse-hair, and be applicable to some of the purposes for which horse-hair is commonly used, such as the manufacture of an artificial horse-hair cloth, and what is technically called seating.

The process of saturating and coating fibrous materials with the said composition or varnish may be performed when the materials are in the state of spun-yarn, dyed of the required color; or it may be applied after the materials have been woven into cloth; or in both states of the manufacture, if found necessary.

The fibrous materials may be linen, cotton, silk, or other suitable filamentous substances, which are to be spun into yarns or threads in the ordinary way, and then treated with the composition or varnish, either by immersion or otherwise, as may be found most convenient. The composition or varnish which the patentee prefers to use for this purpose is made by dissolving in oil the waste or refuse parts of horsehair (obtained from the ordinary modes of drawing, curling, and otherwise manufacturing it), or of pig's hair, or the hairs of other animals, in the proportion of from ten to forty per cent., by weight, of the hair to the oil, which mixture is simmered at a comparatively low temperature. Linseed oil, or other oils previously rendered drying by the usual admixtures and methods of preparing boiled oils, are employed.

In making this composition or varnish, the temperature of the oil is to be gradually raised to a sufficient degree only for dissolving the hair, which should be kept as much under the boiling point of linseed oil as may be found practicable, and capable of effecting the dissolution of the animal matters. When this has been done, about one-tenth part, by weight, of good vegetable lamp black, ivory black, or bone black, is added to, and mixed with, the composition or varnish, to produce a jet black color; or other coloring materials may be employed, if any other tint than black is desired.

In saturating or coating with this varnish the yarns or threads which are to constitute the woof or weft of artificial horse-hair (the threads being first dyed black or of the required color), it will be found convenient to immerse them in the varnish by passing the yarns through a trough containing the varnish, in the act of winding them from one reel to another reel, and then to set the yarns, so saturated, in a japanner's stove or other apartment, moderately heated, for the purpose of drying the composition or varnish before weaving. The process of applying the composition or varnish to the threads or yarns may, however, be performed by any of the well-known methods of dressing yarns by machinery.

A composition or varnish made by dissolving shellac in spirits of wine or wood naphtha, and colored in the way above described, is said to make a very good dressing for the fibrous materials; or the compositions or varnishes commonly employed by japanners for coating leather, iron, and other works, may be used; but the patentee prefers the composition or varnish made with animal hair, as first described, which produces upon the fibrous material a nearer resemblance to real horse-hair.

In weaving the artificial horse-hair, for seating and similar kinds of cloths, the ordinary constructions of looms are employed; the shuttle being worked either by hand or power; and for the warp, threads or yarns of linen are used, which are dressed and fitted for the loom precisely in the way adopted in weaving common horse-hair seating; but for artificial horse-hair cloths, to be employed for other purposes, the warp-threads may be made of cotton or silk, or they may be of other fibrous materials best suited to the uses for which the fabrics are designed, and which need not be prepared with the varnish. For the weft shoot or filling, either linen, silk, cotton, or other threads are used, according to the quality of fabric required, which is to be saturated or coated with the composition or varnish, as described above. These weft-threads of artificial horse-hair may be wound upon bobbins, and woven with a common shuttle, by hand or power, instead of the tedious modes of drawing horse-hairs, one by one, into the work, as usually practised.

The patentee remarks, that he sometimes employs for the woof or weft, as well as for the warp, threads or yarns which have not been prepared with the composition or varnish, but merely dyed; the cloth is then saturated or coated with the composition or varnish in the way to be now described, in reference to the "top-dressing" and the machinery for effecting that process.

It will sometimes be found desirable to give to the face of the fabric, formed by the prepared or varnished weft-yarns, after it is woven, a top-dressing of the composition or varnish, by which the durability of the fabric is greatly increased. This additional coating or top-dressing of composition or varnish is preferred to be laid on by machinery, provided with reciprocating brushes, which lay the fibres and distribute the varnish or composition over the face of the fabric, whereon it has been deposited by a ductor-roller, something in the way of the inking apparatus of a printing machine.

For this purpose the machinery represented in Plate XI., is constructed. Fig. 1, is a horizontal top view of the machine; fig. 2, is a front elevation; and fig. 3, a transverse section of the same. A, A, A, is the framing of the machine, upon which is mounted the main driving-shaft B, having the fast and loose pulleys C, and D, attached thereto, whereby rotary power is communicated to the operating parts of the machine. E, is the cloth-beam or roller, upon which the fabric intended to be operated upon is wound. This cloth is conducted upwards, as shewn by the arrows in fig. 3, over a tension-rod or roller *a*, and then passed round an iron or other hard bed-roller F. The cloth is thence conducted under a second tension-rod or roller *b*, and over another bed-roller G, whence it proceeds in the direction of the arrows to the lapping-roller H, where it is wound up by the friction of contact with the two rollers I, and J. A trough K, containing the varnish or dressing composition, is placed longitudinally along the front of the machine, supported upon the frame-work, as shewn in fig. 3; and in this trough a roller L, which may be compared to the ductor-roller of a printer's inking apparatus, is partially immersed. The roller L, turns upon its pivots, bearing in the ends of the frame, and is made adjustable by screws *c*, in order that the surface of the roller L, may be brought to press the cloth against the surface of the roller F, when the cloth is passing between them. A pinion *d*, is fixed upon the end of the main driving-shaft B, which takes into a large toothed wheel M, and hence, as the main shaft revolves, a quick rotary motion is given to the wheel M. A pulley *e*, upon the shaft of the wheel M, carries an endless band *f*, *f*, which drives the large band-wheel N, fixed on the axle of the bed-roller F, and thereby causes the bed-roller to revolve with a suitable speed for carrying the cloth forward through the machine. A lesser band-wheel P, is also fixed upon the axle of F, and round this an endless band *g*, *g*, passes to a band-wheel Q, upon the axle of the friction-roller I, by which means the lapping-roller H, is made to revolve and wind up the cloth as it is conducted forward by the rotation of the bed-roller F. A pinion on the axle of the roller F, takes into a smaller pinion *i*, on the end of the ductor-roller L, and gives it a rotary movement, by which the varnish or dressing composition in the trough is carried up and deposited, in uniform quantities, upon the face of the cloth, as it passes onward.

In order to distribute the varnish or dressing composition equally over the surface of the cloth, two or more reciprocating brushes R, and S, are employed. These brushes are attached to, or mounted upon, the cranks of two shafts T, T, placed transversely upon the end frames of the machine, seen best in fig. 1. At the end of each of the crank-shafts a bevil-pinion *k*, *k*, is affixed; these pinions take into corresponding bevil-pinions *l*, *l*, upon the main driving-shaft B; and, as the main shaft goes round, the crank-shafts are made to revolve also, and, by so doing, the brushes are brought down, at intervals, upon the face of the cloth; and, by longitudinal movements given to the brushes by the cranks, the varnish or dressing is uniformly distributed over the face of the cloth.

This top-dressing and distributing of the varnish or composition, by means of reciprocating brushes, should be crossways of the cloth, that is, in the direction of the woof or weft, in order to lay the fibres in one direction, and as smooth as possible; and this is best done whilst the cloth is passing over the surface of the bed-rollers, because then the fabric is slightly opened by stretching over the convex bed, when the varnish will more readily penetrate and saturate the fabric.

The drying of the varnish or composition, after it has been spread upon the fabric, may be accelerated by a current of warm air, obtained by placing steam or hot-water pipes, or other contrivances, in any convenient situation under the machine; and a fan or ventilator above may be employed to increase the draft; but such and other hot-air apparatus, equally suited to the purpose, being well known, it has not been thought necessary to represent it in the drawings.

The patentee claims, Firstly,—the preparation of yarns and woven fabrics by saturating or coating them with varnish or composition, to make them resemble horse-hair. Secondly,—dissolving horse-hair, or the hair of other animals, for the purpose of producing a composition or varnish, to be employed for saturating or coating yarns and fabrics, for the purpose of giving to them a resemblance to horse-hair. Thirdly,—the peculiar construction of machinery, shewn in the drawings, and described above, for giving the top coating of varnish or composition, and dressing the fabric in a transverse direction during the operation of drying.—[*Inrolled in the Petty Bag Office, October,* 1845.]

Specification drawn by Messrs. Newton and Son.

To JOSIAH MARSHALL HEATH, *of Winchester-buildings, in the city of London, iron-master, for improvements in the manufacture of cast-steel.*—[Sealed 4th August, 1845.]

ACCORDING to the present invention, the pig-iron to be converted into steel may be melted in a cupola, or in a reverberatory furnace, or it may be run direct from a blast furnace, used for smelting iron ore; but the most suitable apparatus the patentee considers to be a common cupola furnace, blown with hot air, in order that the metal, when run out from it, may retain the highest possible temperature.

The fluid pig-iron should be run from the cupola, or other furnace, into a receptacle made of any material capable of withstanding an intense heat, and similar in form to a common refinery, or to the shallow well of a reverberatory furnace, used for melting pig-iron; and the quantity of fluid pig-iron used for one operation should occupy about one-third, or thereabouts, of the capacity of the receptacle.

The interior of this receptacle, and its contents, should be kept at the highest temperature that can be produced; a ready and convenient method of producing this high temperature is by employing currents of ignited carbonic oxide gas, conveyed through pipes, placed round the top of the receptacle, and slightly inclined downwards, so as to bear upon the surface of the fluid metal. A sufficient temperature, for this purpose, may also be produced by a current of oxyhydrogen gas, produced by directing a stream of atmospheric air into a current of hydrogen gas, formed from the decomposition of water, which is allowed to trickle upon malleable iron brought to a high heat.

In order to burn the carbonic oxide, it is necessary to introduce along with it a current of hot atmospheric air, or if a more intense heat is required, a current of oxygen gas may be introduced along with the carbonic oxide gas; in either case, however, care must be taken that the proportion of atmospheric air, or of oxygen gas, does not exceed that which is required to convert the carbonic oxide into carbonic acid, as any excess of oxygen in the blast would have a most injurious effect upon the melted metal in the receptacle.

The carbonic oxide may be obtained from the waste gas of the cupola employed to melt the pig-iron, or from a blast furnace, or it may be generated in a separate apparatus, by the imperfect combustion of any fuel; and the application of it may be in any of the numerous and well-known methods already in use. The proportion of hot atmospheric air, or of oxygen gas, necessary to form carbonic acid, may be exactly regulated by means of stop-cocks or valves in the pipes by which the hot air or oxygen gas is conveyed into the streams of carbonic oxide.

In order to decarburate the fluid iron in the receptacle to the degree necessary to form steel, a certain portion of malleable iron, more or less, according to the quality of the steel required, is mixed therewith; for cast-steel of a medium degree of hardness, such as is used for general purposes, about equal proportions of pig and malleable iron will be found to answer best.

The proportions in which the pig and malleable iron should be mixed, however, will much depend upon the quality of the former. If grey pig-iron is used, it will require more malleable iron to be mixed with it than if white pig-iron is used; this is a point, the exact determination of which can only be arrived at by testing the quality of the mixed fluid metal in the receptacle, at intervals, by taking out small samples in a metal ladle, and judging of the quality by the fracture when cold.

The malleable iron to be mixed with the fluid pig-iron in the receptacle may be in scraps, or in any convenient form; but by far the most economical, convenient, and pure state in which the malleable iron can be used is the granular form, produced by reducing any perfectly pure oxide of iron to small fragments, and then submitting them to the well-known process of cementation, in a common converting furnace, such as is used for converting bar iron into blistered steel. The iron ore, in small fragments, is mixed with just that proportion of carbonaceous matter which is sufficient to combine with its oxygen, at a red heat, in a close vessel; and when the process is finished, malleable iron is obtained in the purest possible state.

Before adding the malleable iron to the fluid pig-iron, the former must be brought to a white heat; and this may be done in a separate furnace; but the most convenient method is to place the malleable iron on a bed between the receptacle which holds the fluid pig-iron and the chimney up which the waste heat from the combustion of the gas passes. The malleable iron, when at a white heat, is raked into the receptacle containing the fluid pig-iron, and the whole is kept in fusion, and stirred about for a sufficient time to produce intimate mixture and uniformity of composition in the fluid mass; and when the assays taken from it shew that the steel is of the desired quality, the contents of the receptacle are run off into moulds of any size or form required. A vitreous flux should be used to defend the surface of the fluid steel from the action of the atmospheric air while it is in the receptacle.

The apparatus in which the process above described may be performed, may vary in form. The patentee has described the one which he considers best adapted to the purpose, but he does not confine himself to the exclusive use thereof.

In Plate XII., fig. 1, is a sectional plan view of the furnace, the upper part being removed to shew the interior; and fig. 2, is a section taken in the line 1, 2, of fig. 1. A, is the cupola in which the pig-iron is melted. There is nothing peculiar in the form or size of this furnace, but the patentee prefers the use of heated air, to preserve the metal, while running from the furnace, at the highest possible temperature. B, is the bed between the receptacle for the fluid metal and the chimney. The malleable iron, or deoxidated iron, is placed upon this bed, on either side of a channel K; and it is brought to the highest possible temperature, by the passage over it of the flame from the combustion of the gas and air introduced through the pipes G, and H. C, is a receptacle, into which the melted pig-iron is run from the cupola, and into which the malleable iron, at a white heat, is raked through the door D, when at a high heat, and intimately mixed with the fluid pig-iron, by stirring with a wooden pole; the temperature of the contents of the receptacle may be raised to any degree required, by means of the combustion of any gas, rich in carbon and hydrogen, by mixing with it hot atmospheric air, or oxygen gas, as before mentioned; and the proportions required to produce perfect combustion of the gas, without producing an oxidating flame, may be exactly regulated by a stop-cock or valve L, placed on the pipe H. The receptacle may be of any size, according to the quantity of steel required to be produced.

The most convenient gas to be used for this purpose is stated to be carbonic oxide, which may be collected from a cupola or a blast furnace, or may be produced in a separate furnace, by the imperfect combustion of any refuse fuel. The means of producing and applying this gas to the purposes of solid fuel have been frequently described, and are well known.

D, is the door by which the malleable iron or deoxidated ore is introduced upon the bed B, and by which it is raked into the receptacle. E, is a small door, through which a bar of iron or a wooden pole is introduced, for the purpose of stirring the melted fluid. F, is a tap-hole, by which the steel is run into moulds from the receptacle. G, are pipes, through which the carbonic oxide or other gas is conveyed to the receptacle C. These pipes should dip downwards slightly, so that the flame from the ignited gas may play upon the contents of the receptacle, and keep the whole in a fluid state. H, are pipes, through which the hot atmospheric air or oxygen gas is conveyed, to be mixed with the gas in the pipes G. When atmospheric air is used, it may be heated in the pipes I, by the waste flame which passes up the chimney. The method of arranging the gas and air-pipes has been often described, and is well known.

The channel through which the liquid pig-iron is run from the cupola or blast furnace into the receptacle, is shewn at K; and L, is a valve by which the admission of hot atmospheric air or oxygen gas is regulated, so as to produce perfect combustion.

The patentee claims preparing cast-steel by decarburating pig-iron to the degree required to form steel, by mixing with the pig-iron, run from a cupola or other furnace into a separate receptacle, malleable iron, in the proportion necessary to form steel, and running the mixture of pig and malleable iron, while still fluid, and in the state of cast-steel, into moulds from the receptacle.—[*Inrolled in the Petty Bag Office, February,* 1846.]

To THOMAS VAUX, *of Frederick-street, Gray's Inn-road, land-surveyor, for improvements in the manufacture of horse-shoes and horse-shoe nails.*—[Sealed 11th March, 1846.]

THIS invention consists, firstly, in certain modes of fixing the front cauks or toes of horse-shoes; and secondly, in improvements in forming horse-shoes and nails for the same, in order that the nails may be drawn out singly without danger of injury to the foot.

In Plate XI., fig. 1, is a plan view, and fig. 2, a section of a horse-shoe, exhibiting the application of the first part of this invention. *a,* is the front cauk or toe, placed in a recess formed in the shoe; there is a hole in the plate whereon the cauk is formed, and through it a piece *c,* projects, to receive a pin *b,* by which the cauk is firmly secured. Fig. 3, is a plan view, and fig. 4, a section of another horse-shoe; in this case the cauk *a,* is fixed by means of a wedge *b,* which enters dovetail-grooves formed in the projection *c,* and also in the plate whereon the cauk or toe is formed.

The second part of this invention consists in making recesses in the heads of the nails as at *d*, fig. 5, and shaping the holes in the horse-shoe as represented at *e*, fig. 6, so that any of the nails may be extracted when required, by introducing a sharp-pointed instrument into the recess *d*, in the manner shewn at fig. 7.

The patentee claims, Firstly,—the modes of fixing the front projections or caukings *a*, above described. Secondly,—the mode of constructing horse-shoes and nails for the same, so as to allow each nail to be readily removed.—[*Inrolled in the Inrolment Office, September*, 1846.]

To JOHN PARSONS, *of Stone's-row, Saint Pancras, in the county of Middlesex, machinist, for certain improvements in the manufacture of fuel, and in apparatus for the use of the same.**—[Sealed 10th May, 1845.]

THESE improvements in the manufacture of artificial fuel consist in certain methods of combining the materials which compose the fuel into masses or blocks, and protecting such masses when formed. The artificial fuel, so manufactured, may be described, generally, as consisting of materials in a comminuted state, cemented into a mass by an inflammable cementing composition; such mass being coated over with an inflammable composition, protected by saw-dust or other suitable substance, to prevent the masses from sticking together.

The fuel may be composed of any combustible materials usually employed, and which can either be obtained in, or readily reduced into, a comminuted state, as small coal, saw-dust, coke, culm, ashes, tan-bark, peat and peat earths, turf, dry leaves, furze, heath, fir coves, and coppice rakings; also the husks and refuse of all descriptions of grain and fruit, grains from malting infusions, boiled or damaged hops, and the refuse from the distillation of the schistose slate or shale. These several materials may be employed alone, or two or more mixed together, in combination with the inflammable composition hereafter described. When a strong maintaining fuel is required, the patentee uses small coal, with the addition of about one-fourth, by measure, of clay or marl, except the coal employed is anthracite. One part, by measure, of small coal and two of saw-dust may be employed with great advantage; but whatever materials are selected as the basis of the artificial fuel, they must be reduced to powder, and cemented into a mass by an inflammable composition or cement.

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* By a memorandum of alteration, granted November, 1845, to Richard Corke, the assignee of the patent, the words "and in apparatus for the use of the same" were erased from the title of this patent; so that the title now reads "for certain improvements in the manufacture of fuel."

The inflammable composition or cement is prepared in the following manner:—To one ton of purified pitch, coal-tar, or resin, the patentee adds one bushel of plaster of Paris or other argillaceous cement, two pecks of culinary salt, two pecks of pulverized alum, and two pecks of soot or mineral black; instead of the plaster of Paris or other argillaceous cement, a similar quantity of soda and potash (two pecks of each) may be employed; naphtha, the residuum of camphine, nitre, and the oil or fluid obtained by distilling the schistose slate or shale may be employed, together with, or instead of, a portion of the pitch, tar, or resin. These substances are mixed and heated gradually in a boiler; the heating is continued until the mixture boils, or till the scum that is formed during the early part of the operation has entirely subsided. The materials selected for forming the fuel are heated to 150° Fahr. (being stirred occasionally), and then the inflammable cementing composition, in a boiling state, is stirred in.

When small coal or small coal and saw-dust are the materials employed as the basis of the artificial fuel, the patentee uses about six quarts of the hot cementing composition for each bushel of coal or coal and saw-dust; and when the temperature of the whole mass is such that a perfect intermixture of all the substances has taken place, the mixture is formed into cakes or masses, by pressure in moulds; and after these cakes or masses have been allowed to cool, they are dipped in a melting mixture of highly inflammable materials, so as to become thoroughly coated therewith. The composition employed for this purpose may be the same as that already described, or with the addition of two pounds of plaster of Paris to every eight gallons of the composition. This composition being kept boiling, the cakes are dipped into it by means of a cylinder or open frame, and are withdrawn as quickly as possible, and thrown upon a table or inclined plane, thickly strewn with saw-dust; a quantity of saw-dust descends upon them, at the same time, from a sieve or screen, so that they become thoroughly coated on all sides with saw-dust before the hot composition has become set; by this process the fuel is surrounded with a strong water-tight covering. Instead of saw-dust, bran, pollard, or fine chaff may be employed.

The small coal, small coal and saw-dust, or other materials forming the basis of the artificial fuel, and the component parts of the inflammable cementing composition may be mixed together cold, and then heated to such a temperature as will ensure the thorough admixture of all the substances, and the coherence of the particles of coal, &c.

The coating of inflammable cement, protected by saw-dust, may be applied, with great advantage, to pieces of coal, coke, and wood, as such fuel will then be rendered waterproof, and, even after immersion in water, may be ignited with ease, and will burn without waste.

The patentee claims, as his invention, the improvements in the manufacture of artificial fuel, wherein the particles of the materials or mixture of materials constituting the basis of the fuel are cemented together by an inflammable cement, and formed into cakes or masses; these masses being cased in a mixture of highly inflammable materials, and protected by saw-dust or other substance, as above described. And he also claims the casing of coal, coke, and wood with an inflammable composition, protected by saw-dust, as above described.—[*Inrolled in the Inrolment Office, November,* 1845.]

To Thomas Howard, *of the King and Queen Iron Works, Rotherhithe, in the county of Surrey, engineer, for improvements in steam-engine condensers.*—[Sealed 25th March, 1846.]

This invention relates to such condensing steam-engines as have their boilers supplied with water of condensation, and in which the steam is condensed by injecting such water, properly cooled down, into the condenser; the improvements consist in suitably arranging apparatus for cooling the water, previous to its injection into the condenser.

A longitudinal section of the apparatus employed by the patentee is shewn in Plate XIII. *a*, is a tank, placed in any convenient situation, and supplied with cold water by pumps or other means; the water entering at *b*, is guided in its course through the tank by the plates *c*, and escapes at *d*. The ends of the tank are closed by brass plates *e*, in which are fixed the extremities of the tubes *f*, made of copper or other metal; and over the plates *e*, and open ends of the tubes *f*, are fixed "bonnets" *g*, divided into compartments, in the manner shewn. On one bonnet there is a nozzle *h*, connected by a pipe with the hot-water cistern, and having a perforated plate *i*, fixed in it; and on the other bonnet there is a nozzle *j*, connected with the injection-cock.

A quantity of water having been introduced into the hot-water cistern (by first starting the engine with the ordinary injection, or otherwise), sufficient to fill the tubes and properly effect the circulation, the injection-cock connected with the nozzle *j*, is opened, when the warm water will be caused, by the pressure of the atmosphere, to pass from the hot-water cistern, through the nozzle *h*, and to and fro along each series of tubes, determined by the divisions in each bonnet, as indicated by the arrows; by which means it will be reduced to nearly the same temperature as the water that surrounds the tubes; and, after passing through the nozzle *j*, into the condenser, the water will be discharged by the air-pump into the hot-water cistern, from whence it will again pass into the tubes;—any waste which occurs is made good by the ordinary injection.

The injection water and the refrigerating water may be made to change places, the former passing outside and the latter inside the tubes. The patentee recommends that the refrigerating surface be about ten feet per nominal horse power, when the steam is so employed as to leave the cylinder of the engine at ten pounds pressure per square inch, irrespective of the atmospheric pressure. He also recommends that the supply of cold water be not less than twice the quantity of the injection water.

In conclusion, the patentee says that patents were granted to him on October 13th, 1825, and November 31st, 1832[*], in both of which a process of condensation by the reinjection of the same water or other liquid was included; he does not, therefore, claim such process; but he claims the so arranging apparatus that the water for condensation shall be subdivided into many streams in its progress to be cooled and used as injecting water, as described.—[*Inrolled in the Inrolment Office, September*, 1846.]

To George Alexander Thompson, *of Connaught-terrace, Hyde Park, Gent., and* Joseph Wright *of Holborn-bars, mechanic, both in the county of Middlesex, for improvements in propelling vessels.*—[Sealed 25th February, 1846.]

This invention consists in the application to a ship or other vessel of two rotary propellers, so constructed and arranged that projections on the one work into recesses formed in the other. These propellers are contained in cases which receive water through channels or passages from the stem of the vessel, and, by the rotation of the propellers, the water is ejected through other passages, terminating at the stern, by which means the vessel is propelled.

In Plate XII., fig. 1, is a horizontal section of the propellers and water-ways; fig. 2, is a longitudinal section of the same; fig. 3, is a plan view of the vessel on a smaller scale, to shew the position of the machinery and water-ways; and fig. 4, is a side view of the vessel. *a, b,* are two propellers, formed with projections *c*, *c*, and recesses *d*, *d*, which are so arranged, that when rotary motion is given to the propellers, the projections *c*, enter into the recesses *d*, as shewn. *e*, *e*, are two water-ways or passages leading from the stem of the vessel to the chamber in which the propellers rotate,—the patentees prefer that there should be two water-ways, as then one can be placed on each side of the keelson. *f*, *f*, are the passages through which the water makes its exit from the cases by the action of the propellers. Rotary motion may be communicated to the propellers by any suitable means; the arrangement adopted by the patentees for this purpose consists of a cranked shaft *g*, driven by a steam engine, and having two bevil-toothed wheels *h*, fixed upon it, which gear into the bevil-toothed wheels *i*, on the upper ends of the propeller shafts.

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[*] For description of these improvements see London Journal of Arts, Vol. XIV., First Series, p. 181, and Vol. XIII., Conjoined Series, p. 385.

The patentees claim, as their invention, the application of two propellers *a*, *b*, combined with suitable water-ways within a vessel for propelling the same, as above described.—[*Inrolled in the Inrolment Office, August,* 1846.]

To Louis Serbat, *of St. Saulve, in the department of the Nord, in France, chemist, for a new method of constructing the roofs of houses, buildings, sheds, and all other erections.*—[Sealed 25th March, 1846.]

This improved method of constructing roofs consists in combining pieces of wood together, so as to form a series of small connected frames, or rather a large frame, divided into numerous compartments, and in securing plates of iron upon the same by nails or screws, which pass through the four sides of each plate; the object being to obtain a strong but light roof. The lower edge of each plate should overlap the upper edge of the one below to the extent of about one inch and a half. Before the plates are fixed on the framework, such parts of them as will be covered should receive a coat of any suitable preservative paint, to prevent oxidation; and after they have been secured, several coats of the paint should be laid on the plates,—the wood work is also to be protected in a similar manner. The iron plates should be thin for ordinary roofs; but if the roof is to be applied to a terrace for walking upon, the plates must be made proportionably thicker.

When this method is adopted for constructing roofs of houses, the iron plates are to be lined either with very thin planks, or with felt or pasteboard, to prevent the condensation of vapour upon the plates. Roofs of sheds, and any other roofs under which the air circulates freely, do not require any lining.—[*Inrolled in the Inrolment Office, September,* 1846.]

To WILLIAM EDWARD NEWTON, *of the Office for Patents,* 66, *Chancery-lane, in the county of Middlesex, civil engineer, for an invention of improvements in the preparation or manufacture of thread or yarn,—being a communication.*—[Sealed 17th February, 1846.]

THIS invention of improvements in the preparation or manufacture of thread or yarn, as communicated to the patentee, consists in preparing and operating upon hanks, skeins, or quantities of yarn or thread, for the purpose of softening the texture and improving the appearance or quality of the yarn or thread, by giving it a lustrous or shining appearance.

The mode of effecting this improvement is, first to dip the thread or yarn in a glutinous, resinous, or gummy mixture, prepared in the manner hereafter described, and then to operate upon the hanks by a machine, in which they are submitted to considerable friction. The glutinous or gummy preparation employed for the first operation is composed of paste or size and soap, or of paste or size without soap; this paste or size is made of water, in a boiling state, mixed with starch, or the flour of buck-wheat, barley, rye, or linseed, with the addition of either dextrine, gum-arabic, or some other gummy or glutinous material. In selecting either of the above-mentioned substances, care should be taken that that substance which would best suit or least interfere with the color of the thread should be employed; and the quantity of water mixed with the size may be increased or diminished, according to the degree of hardness or softness which it is required to impart to the thread or yarn. The hanks or skeins having been properly prepared, by being dipped in the size or glutinous mixture above mentioned, or any other suitable analogous preparation, are submitted to the operation of the machine hereafter described and shewn in Plate XIII., wherein fig. 1, represents a front elevation of the machine complete; fig. 2, is a plan or horizontal representation, as seen from above; and fig. 3, a transverse vertical section of the same. *a*, and *b*, are two shafts mounted horizontally, one above the other, in bearings affixed to the frame-work of the machine, and upon them are keyed the two toothed wheels *c*, and *d*, respectively, which receive their motion from the pulleys *e*, connected with the prime mover by a band or strap. These two shafts *a*, and *b*, are mounted in bearings f, f^1, and g, g^1, secured to the upright posts *h*, *h*, of the frame-work, which posts are connected together by the pieces *i*, *j*,—the pulleys *e*, and gearing *c*, and *d*, being situated between them. Outside the uprights *h*, *h*, and upon the shafts *a*, and *b*, flyers or fans, with four wings or blades k, k^1, l, l^1, made of wood, are placed, and are secured thereon by iron pins, placed inside. The wings or blades of the fans or flyers are covered with cloth, or some other material, composed of flax, hemp, cotton, or wool, according as a greater or less amount of friction is required. Behind and below, but parallel with the shafts *a*, and *b*, are the iron rods or shafts *m*, and *n*, seen best in the sectional view, fig. 3. These shafts *m*, and *n*, pass through the uprights *h*, and are secured thereto by means of rings, so as to maintain them in their places; and they serve not only to assist the blades of the fans l, l^1, to support or undergo the work without too much vibration, but also to prevent the thread from touching the under or hinder part of the fans or flyers k, k^1, l, l^1. In front of the fans l, l^1, is a table *p*, upon which are placed two small wooden frames *q*, and *r*, which have an inclined guide at each side, and upon which the rollers *s*, run. These rollers are mounted in bearings or hooks, at the ends of the pieces of iron, in the form of a T, as seen in fig. 2. The tail end of this T-shaped piece of iron slides in two guides *u*, which maintain it in its proper position. Under this tail is fastened a strap, which passes over a small roller *v*, and carries, at its opposite end, a weight *w*, so as to give it some degree of tension. The operation of the machine is as follows:—One or more hanks or skeins of thread, damped with the glutinous preparation above mentioned, are placed upon the shafts *m*, and *n*, and the fan or flyer *l*, at one end, and the same is done at the other end of the machine; the thread is also passed round the rollers *s*, as seen best in the detached sectional view, fig. 4, which explains and shews this part of the machine more clearly than the other figures; and the rollers *s*, are then placed on the inclined guides of the frames *q*, and *r*, and are connected, at their extremities, to the pieces *t*. The little roller *x*, shewn in the sectional view, is placed there merely to impart greater tension to the thread, and prevent it from being drawn round too quickly by the friction. The four flyers or fans k, k^1, l, l^1, being connected together by means of the gearing or toothed wheels *c*, and *d*, containing an equal number of teeth, always preserve their relative position when the machine is put in motion; and the blades or vanes k, k^1, are made continually to rub the surface of the thread which is stretched over the uppermost blades or vanes of the flyers or fans l, l^1, while the blades or vanes of the flyers or fans l, l^1, rub the surface of the thread which is extended on the shafts or rods *m*, and *n*, and the rollers *s*, by the tension of the weight *w*, as seen best in fig. 3. The rollers *s*, which strain the thread by means of the tension of the weight *w*, also prevent the thread from being drawn forward too quickly, so that the blades of the flyers k, k^1, l, l^1, may each in their turn, and in a proper manner, be made to rub the upper and under side of the thread with great force and speed, while the thread is going forward very slowly; by this means imparting to the thread a lustrous or shining appearance.

The patentee states, that he lays no claim to such parts of the operations above described as have been heretofore known and in use, such as sizing threads for the purpose of laying the fibres; nor does he intend to confine himself to the precise arrangement or construction of parts herein shewn, as they may, doubtless, be varied without departing from the nature or object of the invention; but he claims preparing and finishing thread or yarn by means of the process and operation above shewn and described, whereby the appearance of such thread or yarn is much improved.—[*Inrolled in the Petty Bag Office, August,* 1846.]

Specification drawn by Messrs. Newton and Son.

To HENRY BLUMBERG, *of Camberwell-grove, in the county of Surrey, distiller, for improvements in the purification of spirits for the use of brewing-distillers and rectifiers.*—[Sealed 4th November, 1845.]

THIS invention consists in an arrangement of apparatus in which wines or spirits may be speedily and effectually purified, by being subjected to a series of filtrations through layers or beds of powdered charcoal.

In Plate XII., fig. 1, represents the improved apparatus in elevation; fig. 2, is a vertical section; and fig. 3, is a plan view of the same. It consists of two series of cylindrical tanks A, A, each containing ten tanks, placed in pairs, one tier above the other; these series extend one to the right and the other to the left-hand. The tanks, at a little distance above their bottom, are each furnished with a perforated disc or false bottom *a*, to receive the powdered charcoal. B, B, are upright beams for supporting the tanks; C, is a reservoir placed above the tanks A, and midway between the two series. This reservoir is intended to receive the wine or spirit to be operated upon, and to supply it, as required, to the tanks A, through which it is filtered. In the bottom of the reservoir is a short pipe, furnished with a cock, and communicating with a horizontal pipe D, which leads round to the four tanks A^1: see the plan view fig. 3. Over the centre of these tanks, vertical pipes E, are provided, which are connected to the pipe D, and receive the spirit therefrom, to conduct it into the funnels F. The peculiar construction of these funnels will be best seen by referring to the detached views, figs. 4, in which 1, is a circular bottom, with openings or spaces cut on its outer edge, to allow the liquid, when the funnel is standing in the tank, to flow under the bottom. This bottom 1, carries a cylindrical tube 2, formed at its upper end into a bell-mouth, and provided at its lower end with a ring of small holes. Within this tube 2, and concentric therewith, is a tube 3, of smaller diameter, having a flange on each end; that on its upper end being inclined inwards, and the flange on its lower end being made to fit the space between the two tubes, and thus form a water-tight junction between them. The object of this peculiar formation of funnel is, that the spirit to be operated upon, as it descends the pipe E, may fall into the space between the tubes 2, and 3, and when it has filled that space, may flow down the tube 3, and out into the tank through the holes in the bottom of the tube 2, in small streams, and thus prevent the charcoal on the perforated bottom of the tank from being disturbed. The supply of liquor to the tank is regulated by a ball-cock G, with which the pipes E, are provided; and in the bottom of the tank are two cocks *b*, and *c*, for drawing off the liquor after it has passed through the perforated bottom *a*. By referring to the drawing it will be seen that the tanks A^1, A^2, A^3, A^4, rest upon that immediately beneath them, and are in part supported thereby. The liquor from the cocks *c*, flows into the funnels F, beneath, and thence into the respective tanks of those funnels; which tanks are provided with a tube H, to allow the air to escape from the space under the perforated bottoms *a*, when that part of the tank is being filled with liquor. Beneath each of the cocks *b*, is a funnel *d*, for guiding the liquor (when required) into the descending pipes *e*, *e*, and thence into the horizontal pipes *f*, with which the pipes *e*, are respectively in connection. The inner ends of the pipes *f*, terminate in a receiver I, placed below the tanks A^5, and immediately under the receiver C; and the other ends of the pipes *f*, respectively terminate in the two receivers J, which are each provided with a force-pump K, for impelling the liquor up the ranges of pipes L, L^1, respectively, in order that it may descend through the pipes g^1, g^2, g^3, g^4, g^5, into the tanks, as required, and undergo a further filtration. These pipes *g*, are all provided with a cock *h*, for cutting off the communication with the tanks A, at certain periods of the operation; and the pipes *f*, are furnished with two cocks *i*, and *k*, one of which must be kept closed during the operation of purifying the spirit, as will be more fully explained hereafter. After the spirit is sufficiently purified, it is allowed to flow into the receiver I, from whence it is raised by the lift-pump M, and carried off to any convenient distance by the pipe N.

Having described the construction and arrangement of this improved apparatus, the patentee proceeds to explain the mode of working the same.

Any given quantity (say 1300 gallons) of low wine or spirit, not stronger than 30° under-proof, is pumped up into the reservoir C, to be filtered through one set of tanks. The false bottoms *a*, of the tanks A, are covered with a disc of filtering cloth, and on the centre of this cloth a smaller disc of cloth is laid, which will prevent the liquor from percolating through too quickly. Over these cloths the pulverized charcoal (that made from pine wood, well burned, and finely pulverized, he prefers,) is carefully spread, so as to present an even surface. The proportions to be used for cleansing very crude and empyreumatical low wines or spirits are as follows:—

			lbs.
Each tank marked	A^1,	should contain about	13½
Ditto	A^2,	ditto	8
Ditto	A^3,	ditto	5
Ditto	A^4,	ditto	4
Ditto	A^5,	ditto	2½
			33

The quantity of charcoal to be spread over the false bottoms of the ten cylindrical tanks will thus amount to 66 lbs. When this operation is performed, the cock of the reservoir C, is opened, and the liquor allowed to run quickly through the pipe D, down the pipes E, into the funnels F^1, and thence to the tanks A^1.

The cocks *b*, of the tanks A^1, must be opened when the tanks are half full, to run the liquor out into the funnels *d*, whence it proceeds down the pipes *e*, into the horizontal pipes *f*, and thence to the small receiver J; the cock *k*, of the pipes *f*, being for that purpose open, and the cock *i*, closed. When the liquor has flowed into the receiver J, it must be immediately forced up the pipe L, by means of the pump K; and the cock h^1, of the pipe g^1, being open, and all the other cocks in the branch part of the pipe L, closed, the liquor will flow down the pipe *g*, into the funnels F^1. This operation of pumping is to be continued until the liquor has lost a part of its nauseous smell and is as clear as water.

The liquid having been thus purified, the cocks *b*, in the tanks A^1, must be closed, and the cocks *c*, opened. The fluid is then allowed to run through the funnels F^2, into the tanks A^2, and when they are half full, the cocks *b*, in those tanks are opened, and the liquor is allowed to flow to the receiver J, whence it is pumped up the pipe L; and all the cocks in the branch part of that pipe, except the cocks h^2, being closed, the liquor is allowed to descend the pipes g^2, pass through the funnels F^2, and enter the tanks A^2.

As regards the remaining tanks A^3, and A^4, they are proceeded with in exactly the same manner, until the liquor is perfectly clean; and when it has reached that state, the cocks *k*, in the pipes *f*, are closed, and the cocks *i*, opened, through which the clean spirit from the filter-casks A^4, runs out at the cocks *b*, down the funnels *d*, and along the pipes *f*, into the receiver I; from whence it can be removed at pleasure, by means of the force-pump M, and pipe N. Should, however, the low wine or spirit under operation be less empyreumatical, and it be found, during the process, that it runs from the third filter-cask quite free from all nauseous taste or smell, the fourth filter-cask may, of course, be dispensed with.

The tanks A^5, are reserve filters, and the liquid is only filtered through them when two-thirds of the 1800 gallons, already mentioned, have been run off. These tanks are then brought into operation in precisely the same manner as the other filter-tanks.

The low wine or spirit, cleansed according to this method, is so perfectly pure that, in case stronger descriptions are required, it can be brought to any degree of strength by merely mixing it with other rectified spirits of the required strength.

The apparatus shewn in the drawing, consisting of ten filtering-tanks, made of wood or copper, can produce about 1300 gallons every twenty-four hours. If larger quantities are required, the series of apparatus must be multiplied.

When the above-mentioned quantity of liquid is cleansed, the charcoal containing the nauseous parts is removed, as also the remaining liquid, and the cloth of the false-bottoms is thoroughly washed with water and scoured.

In order to save time in the operation, it is as well to let out from the tanks A^1, the unfiltered liquid through the cock *l*, which, through a moveable hose, in connection with the funnel *d*, will pass the liquid to the pipes *f*, whence it will flow to the receiver J, and may then be pumped up into the tanks A^1, by the next working, without waiting until the liquid has percolated through the false bottom.

The charcoal, containing the empyreumatical and spirituous parts of the liquid subjected to the cleansing, must immediately be distilled, in order to extract from it the spirituous parts it has imbibed.

In the space between the two series of tanks a ladder should be placed, (as shewn at fig. 2,) to enable the workman to carry the charcoal up and down, and also to perform the other necessary work, without stepping upon the tanks. It may be here remarked that, for the perfect working of the apparatus, the tanks should be placed exactly perpendicular, so that the bottoms may be perfectly even.

The patentee claims, Firstly,—the peculiar arrangement of apparatus for purifying spirits, as above described, with reference to the drawing. Secondly,—the mode of subjecting the liquor to repeated filtrations in the same tank, and thence conducting it to one, two, or more tanks, in which the same operation of successive filtrations is carried on, as above described; by means of which a great saving of time is effected in the purifying operation, and the quantity of charcoal employed is materially diminished.—[*Inrolled in the Petty Bag Office, May,* 1846.]

Specification drawn by Messrs. Newton and Son.

To Henry Dircks, *of Nicholas-lane, in the city of London, engineer, for improvements in the means of obtaining and preparing extracts from certain vegetable matters, and in the apparatus connected therewith; which apparatus may be also applied to other similar purposes.*—[Sealed 18th November, 1845.]

These improvements consist, firstly, in manufacturing a concentrated extract of malt, combined with an extract of unmalted grain or farinaceous matters, and with or without the addition of hops or other vegetable matters; secondly, in certain apparatus of a novel construction, to be employed for evaporating extracts of all such vegetable matters; thirdly, in the application of the said apparatus to other similar purposes, as the evaporation of water, brine, and other liquids, however viscid.

The patentee having obtained an infusion of malt, with or without unmalted grain, by the usual process of mashing, proceeds in the next place to boil it with or without farina, hops, or other vegetable matters. This boiling process is continued at a temperature varying from 160° to 190° Fahr., taking care to avoid discoloring the extract. The same observations will apply to all other vegetable infusions to be submitted to concentration, as no claim is made for any particular method of obtaining such infusions.

The extracts intended for brewing from, are preferred to be made with wort prepared from the finest pale malt, along with the best hops. When intended for home-made wines, or beer, the finest pale malt only is used. The extracts intended for coloring matter, and which have to be evaporated at a temperature of 200° and upwards, until sufficiently carbonized, are prepared by adding a portion of unmalted grain or farinaceous matter, generally in the proportion of one-third of the former to two-thirds of the latter, or thereabouts; the infusion being kept heated at a temperature ranging up to about 167° Fahr., until saccharized; after which, evaporation may be conducted at from 212° to 300°, or any desired temperature. The extracts, when prepared to have medicinal properties, may be concentrated infusions of one quarter of malt, combined with about 10 lbs. or 12 lbs. of ginger; or one quarter of malt, combined with about 4 lbs. of spruce, and 4 lbs. of hops; or one quarter of malt, combined with one bushel of scurvy grass, and 6 lbs. of hops; or about these proportions for each; and may be brewed from to make beer of excellent quality. Other descriptions of extracts may be combinations of an extract of malt, or malt and hops, and with honey; or the same extracts may be flavoured with liquorice-root, or like medicinal vegetable matters.

When using evaporating pans, the patentee inserts in them a false bottom or steam shield, with one or more appropriate steam-pipes, the object being to collect and bring off the steam formed at the bottom of the pan or boiler, through the central portion only of the contained liquid. In Plate XI., are several arrangements of apparatus suitable for evaporating extracts and solutions. Fig. 1, represents, in longitudinal section, one arrangement of evaporating apparatus, in which A, A, is a large copper or boiler; B, a false bottom or steam-shield, provided at its centre with an upright pipe C, which is surrounded by a tube D, of a larger diameter and open at both ends. This tube D, is supported by arms from the pipe C, and is intended to detain and convey back to the pan, copper, or boiler, whatever liquid may be carried up the pipe C, along with the steam. The steam-shield B, is placed a short distance from the bottom of the pan or other boiler, and may have a rim turned down round the edge, and be slightly convex towards the steam-pipe, to collect and direct the steam to the escape-tube C. Fig. 2, is a section of the shield, with short tubes, *d*, *d*, for favoring the circulation of the liquid; these tubes, being of small diameter, will permit little or no steam to escape through them; and they require to be no longer than the depth of the outer rim *e*, *e*.

Fig. 3, is another mode of applying the same invention for domestic or other purposes. A, is a common pan; B, the double bottom or steam-shield; C, the steam-pipe; and D, the hood or conductor, for detaining and returning to the contents of the pan whatever liquid would otherwise have boiled over.

Fig. 4, shews a mode of exhausting the steam by mechanical means; A, is the pan or boiler; B, the steam-shield; C, the steam escape-pipe, surrounded with a casing or pipe D. A series of such pans or boilers may have their steam-collecting pipes connected with a main-pipe E, by pendant pipes F, and so be made to communicate with a fan G, or with a pump, or other mechanical means of exhausting the air and vapour; H, is the driving-strap and pulley.

The concentration of any of the described extracts may be carried sufficiently far to render them solid and capable of being conveniently packed, by simply covering cakes or rolls of them with tinfoil. This inspissation may be conveniently performed by the process of stoving the concentrated extract in a hot air chamber; the extract being therein exposed in shallow dishes, or other suitable vessels, until it is brought to a suitable consistence.

The patentee claims, Firstly,—the preparation of a concentrated saccharine extract from the peculiar combination of malt and unmalted grain, or other farinaceous matters, with or without hops. Secondly,—the several combinations of the foregoing extracts, and also those of malt alone, or malt and hops, with ginger, spruce, scurvy grass, honey, liquorice, or horseradish. Thirdly,—the steam-shield apparatus for collecting the large body of steam, formed under the liquid surface, or close to the bottom of the pans and other boilers, and conducting its discharge through a small portion of the contained liquid, whether used singly or combined with any mechanical mode of exhausting the steam. Fourthly,—the application of the steam-shield apparatus to other like purposes, for preventing boiling over during violent ebullition in evaporating water, brine, and any other liquids, however viscid they may be.—[*Inrolled in the Petty Bag Office, May,* 1846.]

Specification drawn by Messrs. Newton and Son.

To Philip Smith, *of High-street, Lambeth, in the county of Surrey, locksmith, for improvements in locks, latches, and other similar fastenings.*—[Sealed 22nd December, 1845.]

This invention of improvements in locks, latches, and other similar fastenings, consists in certain novel arrangements, or combinations of parts, whereby doors, drawers, portmanteaus, travelling bags, &c., may be secured from being surreptitiously opened. The invention refers principally to a simple and efficient adaptation to locks of sliding pieces or wards, which must be raised to a certain given height before the bolt or catch can be moved.

In Plate XIII., at figs. 1, 2, and 3, an arrangement of lock for a desk or portmanteau is shewn, by the use of which a double security is obtained; the barrel of the key having first to act upon a "Bramah" barrel lock, before being able to turn and raise the sliding wards before mentioned.

Fig. 1, is a front view of the lock, complete; fig. 2, is a horizontal section taken in the line 1, 2, of fig. 1; and fig. 3, is a vertical section taken in the line 3, 4, of fig. 1. A, A, is the back plate of the lock; B, B, is a frame attached to the plate, and intended to receive the cap or plate C, which preserves the working parts of the lock in their places; D, is a sliding-plate, to which is attached the bolt E, and a guide or check-piece F; spaces are cut in the frame B, to allow the bolt and check-piece to move freely backwards and forwards. This sliding-plate D, is provided at its lower edge with a shelf or ledge *a*, *a*, on which any given number of sliding pieces or moveable wards *b*, rests; and, at about the middle of its length, the ledge *a*, has an opening formed in it, to receive the tail of the wards *b*. These sliding pieces or wards (one of which is shewn detached at fig. 1*,) are formed of sheet metal, and are each provided with a vertical slot, through which a bar or pin *c*, attached to and projecting from the plate D, passes, for the purpose of securing them to that plate. The wards *b*, are also furnished with two other vertical slots, brought into connection with each other by a horizontal slot. These three slots, which together are somewhat similar in shape to the letter H, are intended to receive a pin *d*, attached to the plate A, and projecting through a horizontal slot in the sliding-plate D. The three vertical slots in all the sliding wards are made so as to coincide when the wards rest upon the ledge *a*; but the horizontal slot should differ in position in all the wards; a sufficient width being preserved in the slots to allow the wards to move backwards or forwards, without interruption from the fixed pin *d*. *e*, is a plate, screwed on to the ledge *a*, in order to keep the wards parallel to each other; *f*, is a series of springs for resisting any upward pressure communicated to the wards, and for returning them to their original position on the ledge of the sliding-plate D. One end of each of these springs is attached to a stud in the plate D, and the other ends ride severally over a projection on the upper edge of the wards.

The Bramah barrel (the construction of which it will be unnecessary here to explain) is represented at G, and to it is attached a circular plate, having a tail-piece or tappet *g*, which, when made to turn round by means of a key, comes against one of the inclined sides of a recess formed in the lower edge of the sliding-plate D, and drives that plate, and the bolt attached thereto, either backwards or forwards, when the sliding wards *b*, are adjusted, so as to pass the fixed pin *d*. In order to raise the sliding ward to the proper height for bringing the horizontal slot of the wards into coincidence, suitable tappets are formed on the key; and when brought by the rotation of the key under the tail of the sliding wards, they will lift up the wards to the required position, so as to allow the bolt to pass freely. At figs. 4, and 5, the improved combination of Bramah barrel and moveable wards are shewn, as applied to a padlock. Fig. 4, is a view with the side plate and an inner plate removed, to shew the interior construction more clearly; and fig. 5, is a section taken in the line 1, 2, of fig. 4. In this arrangement, the sliding wards *b*, (one of which is shewn detached at fig. 5*,) are formed of rectangular plates of metal, and are provided only with the H-shaped slots before mentioned. The wards are placed between two vertical guides, attached to or forming part with the sliding-plate D, which, as in the former instance, carries the wards *b*. This plate D, has horizontal slots cut, in it to receive short studs *h*, which project from the side plate, and serve as guides and stops to the plate; and it is also provided with a horizontal slot, through which the fixed pin *d*, projects, as in the former arrangement. On the upper part of the sliding-plate a lip or flange is provided, which takes into a notch, cut in the end of the shackles *i*, and forms the bolt of the padlock. The other parts being similar in arrangement to the lock above described, and corresponding letters being placed on the same parts, any further description will be unnecessary.

Fig. 6, represents an arrangement of lock suitable for securing iron safes, drawers, portable desks, and cupboards. The Bramah principle is not in this case employed, but the sliding-plate which carries the bolt is provided with a given number of moving wards. A, is the sliding-plate, which, as in the arrangement of the padlock, carries the moveable wards *b*, between vertical guides. The sliding-plate A, is furnished with a slot, through which a fixed pin *d*, protrudes into the slots of the wards *b*, as before mentioned. K, K, are two bolts, placed one on each side of the ordinary bolt E; these bolts, K, are somewhat similar in form to a bell-crank lever, and are respectively attached at one end to the side plate of the lock by a fixed stud *i*, on which they vibrate. The bolts K, are also connected to the sliding-plate A, by the studs *k*, in order that they may receive motion therefrom. When the key is applied to this lock and the bolt E, is forced forwards, the ends of the side bolts will spread out laterally, as shewn in the figure, and suitably-formed openings having been made in the striking-plate of the lock, they will enter therein, and, as it were, grasp that plate and hold it with greater security than the ordinary straight bolt. These curved bolts may be employed either by themselves or together with the straight bolt, as shewn in the drawing. Instead of the tail-piece or tappet *g*, which is used in the previously described arrangements for sliding the plate D, backwards and forwards, the key must be made to press against the inclines on the lower edge of the plate A, and thus propel and draw back the bolts.

Figs. 7, and 8, shew a novel construction of mortise-latch, more particularly applicable to the doors of banking-houses, taverns, and places of public resort. Fig. 7, is a view of the improved latch, having the side plate removed to shew the interior construction; and fig. 8, is a cross section of the same taken in the line 1, 2, of fig. 7. A, is the latch which slides in a guide *a*, and is projected forwards by a spring *b*. The inner end of the latch is formed into a right angle, and its vertical part is provided with a steep incline *c*, against which a plate *d*, having a bevilled edge, is in contact. Through this plate, the spindle on which the handles *e*, *e**, are mounted is passed, and secured thereto; and on each side of the door a socket *f*, *f**, is formed, to receive the inner end of the handles. When the door is required to be opened the handle *e*, is pushed forward, which motion drives the bevilled edge of the plate *d*, against the incline *c*, of the latch, and draws the latch out of contact with the box-staple or striking-plate on the door-jamb. The same effect is produced on the other side of the door by pulling the handle *e**, forwards.

The last part of the invention consists in a novel arrangement of mortise lock, which combines the principle of a latch-bolt, and lock. This improved fastening is shewn in edge view at fig. 9, and in side view, with some of the parts removed, at fig. 10. A Bramah barrel is set in the middle of the lock, and attached to the side plate. On the under face of the barrel a short pin projects (see the detached view fig. 9*) into a peculiarly-shaped opening 1, in the sliding-plate A, which carries the bolt B. This opening or space 1, in the plate A, is so formed, that the plate will not come in contact with the pin on the under face of the Bramah barrel when the lock is used merely as a latch or bolt. 2, 2, are the inclined sides of an opening in the plate A; and against these sides the pin 3, of an arm 4, (see the detached view fig. 10*) affixed to the socket of the spindle which carries the handles of the lock, works. When, therefore, the handle of the lock is turned, whether to the right or left, the latch will be drawn back. 5, is a pin attached to the sliding-plate A; 6, is a stop on the side plate of the lock; 7, is a stud also attached to the side plate, and upon it a lever 8, works, which is sufficiently long for its end to abut against the pin 5. The end of the lever 8, is pressed against the pin by a spring 9, and by this means the bolt is pressed forward as far as the stop 6, will allow the lever 8, to move. 10, is a knob projecting from a socket, which turns in the side plates of the lock, and is intended to receive a short square spindle 11, provided with a handle. This handle, when turned, will bring the knob 10, against the back of the latch-bolt, and prevent the large handles from turning and drawing back the latch. When the door is intended to be locked, the key is applied to the Bramah barrel, and the pin on the under face of the barrel is brought against one side of the space 1, in the sliding-plate A. By this means the latch is protruded to its furthest distance, and the handles will then have no effect upon it. A horizontal slit is made in the plate A, in connection with the inclined sides 2, 2, to allow that plate to pass forward without interruption from the pin 3, on the arm 4. The peculiar construction, therefore, of this lock, admits of a latch-bolt and lock-fastening being obtained by the employment only of one bolt. At fig. 11, a mode of protecting the bolt of a drawer-lock from being sawn off, or forced out of connection with the striking-plate, is shewn. It consists in casting a right-angled piece *a*, on the outer edge of the "selvage" of the lock, and thus the insertion of a chisel or saw-blade will be prevented. The same kind of security will be obtained in desk and box locks, by forming the selvage and striking plate as shewn at fig. 12.

The patentee claims, Firstly,—the peculiar arrangements and combinations of parts for forming a secure lock or fastening, as above described, wherein a series of moveable wards, supported by the sliding-plate which carries the bolt, are made to pass over a fixed pin in the lock-plate; and when not raised to their proper height, so as to pass that pin, will prevent the movement of the bolt, as before explained. Secondly,—the combination of the Bramah barrel and moveable wards, whereby a double check is given to any attempts at surreptitiously opening the lock or fastening. Thirdly,—the application of the vibrating side bolts shewn at fig. 6, to locks in general, where a strong hold is required to be taken of the striking-plate or hasp of a door-jamb, or of a folding door. Fourthly,—the peculiar construction of latch-lock shewn at figs. 7, and 8, or any modification thereof wherein the withdrawal of the latch from the box, plate, or catch on the door-jamb is effected by thrusting one inclined surface against another inclined surface. And, Lastly,—the peculiar arrangement, construction, and combination of parts, as shewn at figs. 9, and 10, whereby a latch, bolt and lock-fastening is obtained with the employment of but one latch or bolt.—[*Inrolled in the Petty Bag Office, June,* 1846.]

Specification drawn by Messrs. Newton and Son.

To FERDINAND CHARLES WARLICH, *of Deptford, in the county of Kent, Gent., for improvements in the manufacture of fuel.*—[Sealed 7th April, 1846.]

THIS invention consists in subjecting manufactured fuel to the process of coking, for the purpose of obtaining coke in regular shapes, more convenient for stowage than the irregular masses of coke manufactured in the ordinary manner.

The description of manufactured fuel which the patentee prefers to use in carrying out this invention is that composed of the small of anthracite coal, of free burning coal, and of bituminous coal, mixed with pitch or bituminous matter, and moulded into bricks or rectangular forms; but he does not claim the same, nor confine himself thereto, as other manufactured and moulded fuel, composed of coal, may be treated according to this invention. The manufactured fuel is subjected to heat in retorts or ovens, in such a manner as to drive off the volatile products therefrom, as described in the specification of a patent granted to the present patentee, October 5, 1843. The bricks or blocks of moulded fuel are then converted into coke by the ordinary process of coking; for this purpose, the patentee prefers to employ coke ovens of a square form, with flat roofs, as the moulded fuel will pack better therein, and with less loss of space than in a common coke oven. The bricks or bocks of fuel are placed one upon another, leaving only a small space between the sides of the bricks or blocks; the fuel is then lighted, and the coking is conducted in the usual manner.

In conclusion, the patentee says, "I make no claim to moulding bricks or blocks of manufactured fuel; nor do I claim the coking of coal, whether one or more descriptions of coal is or are used at the same time when this process is being performed; but what I claim is, the subjecting of moulded manufactured fuel to the process of coking."—[*Inrolled in the Inrolment Office, October,* 1846.]

To WILLIAM NEWTON, *of the Office for Patents,* 66, *Chancery-lane, in the county of Middlesex, civil engineer, for an invention of improved modifications and novel applications of known machinery and processes to the purpose of cleaning, softening, dividing, and preparing flax, hemp, and other vegetable fibrous materials,—being a communication.*—[Sealed 14th August, 1845.]

THIS invention, as communicated to the patentee from abroad, consists in the novel application of an apparatus (constructed upon the principle of the fulling-stock) to the purpose of operating upon certain raw materials, such as flax, hemp, jute, abaoca, phormium-tenax, aloes, and other plants of the genus known under the name of textile plants, containing filaments capable of being converted into yarns or threads.

The inventor claims the novelty of its application principally to the class of textile plants called "monocotyledons," the filaments of which are obtained from the interior fibres of their leaves, and are, consequently, covered with a parenchyma (or pulpy covering), and impregnated with a gummy resinous substance, which renders them hard and tough. These plants may either be operated upon in their natural state, or after they have undergone any of the ordinary preparations.

The machinery above mentioned, and the process necessary for carrying the improved operation into effect are as follows:—First,—the plants must be firmly twisted together in bundles of about a pound each, in order to prevent their fibres becoming entangled when operated upon in the machine. The plants must also be cleansed and deprived of all gummy and other extraneous matters, and be softened by being beaten or pressed.

A quantity of about 80 lbs. weight of the plants, twisted up in bundles, as before mentioned, is laid in a trough or bed (hereafter described), and submitted to the action of two beaters, acting alternately.

The form, construction, and operation of the apparatus will be best understood by reference to Plate XI., in which fig. 1, represents a side elevation of the apparatus; the side of the bed or trough, in which the substances to be operated upon are placed, being removed. This bed or trough may be made of cast-iron, copper, or other metal, suitable for applying heat for softening the plants. Fig. 2, is a plan or bird's-eye view of the machine. The face of the internal surface of the trough or bed is formed by three curves, as will be best seen upon referring to fig. 3, which represents a sectional view of the bed or trough detached. The first curve is that in front, about two feet in length, which is a segment of a circle, formed by a radius of about ten feet, which will be the length of the arms that carry the beaters; the second curve is also a segment of a circle, formed by the bottom of the trough, about ten inches in length, and having a radius of about ten inches; the third curve is about nineteen inches in length, and has a radius of nearly twenty-one inches. The width of the trough at top is about twenty-four inches.

The wooden beaters or hammers are of equal size, and they are lifted by rotary tappets or cams, and fall alternately upon the substances placed in the bed,—they are about 400 lbs. in weight, and fall a distance of about two feet. Their weight, and the extent of their fall, may, however, be varied, according to the degree of hardness and resistance offered by the plant. These beaters are furnished with five teeth at that part which operates upon the materials. The front tooth *a*, projects about half an inch beyond the two following or intermediate teeth, and is two and a half inches in thickness. The two intermediate teeth *b*, *b*, between the first and fourth teeth, are constructed by describing for each of them an arc of a circle, having a radius of one inch: these two intermediate teeth are each two inches thick. The fourth tooth *c*, is about two and a half inches longer than the first: it is one inch and a quarter in thickness. A space is formed between this last-mentioned tooth and the fifth tooth of two and a half inches. The fifth and last tooth *d*, is four and a half inches in thickness, and it projects downwards nearly seven inches. The upper face of the beater is perpendicular with the first tooth, and its under side is curved according to the shape of the trough or bed; it being intended, when in operation, to move up and down, as close as possible to the inner surface of the trough, without actually touching it. The teeth of the beaters may be covered with sheet copper, or other suitable metal, to protect them from abrasion; and the arms of the beaters are to be mounted in such a manner as to vibrate in an arc concentric with the curve of the front part of the trough.

The operation of beating the fibrous materials is intended to be carried on for a greater or less duration, in proportion to the quality of the plant, and the resistance it offers; generally it will be sufficient if continued for about four hours.

The following is the action and effect of the beaters upon the plant, in order to convert it into separate fibres or filaments:—The alternate action of the beaters turns the plant over and over, in a regular and uniform manner, compressing it at the same time forcibly against the sides of the bed, and thereby causing the fibres to rub against each other at every stroke of the beaters. The outer covering or woody portion of the plant is first broken and then removed; this is effected principally by the peculiar shape of the teeth of the beaters, which break, soften, and beat out all the substances adhering to the plant.

After a certain time, the outer covering and ligneous matter being broken off, the filaments are separated and the plant is gently heated, which facilitates the removal of the gummy matters, and all parts of the plant become completely softened. After this operation and a suitable cleansing in water, the fibres may be operated upon in the ordinary manner.

It is almost unnecessary to remark, that the cams or tappets *e*, *e*, which raise the beaters, are fixed upon a shaft *f*, which may be worked by a steam-engine or water-wheel, or other convenient power. This, however, constitutes no part of the invention, as it is the ordinary mode of actuating this description of machinery.

The matters which adhere to the phormium-tenax, as it arrives in Europe, after undergoing some preparation in the islands of the Pacific Ocean, are composed of a parenchyma or outer covering, and an invisible gum within the plant. It is for the purpose of separating these extraneous substances from the fibres or filaments of the plant that the above-described process is applicable, and is intended to be employed; it may also be used for all other analogous textile plants. Phormium-tenax may also be operated upon in the green state.

The patentee states, that he does not claim, as new, the construction of the apparatus shewn in the drawing, except as applied to the purpose before mentioned; but that which he claims is, Firstly,—the employment generally of an apparatus constructed in a similar manner to the ordinary fulling-stock, and particularly such as that above shewn and described, for the purpose of beating, breaking, or operating upon textile plants of all descriptions; and, Secondly,—constructing the beaters and trough or bed of the stocks in the manner above shewn and described, whereby the apparatus is rendered more effective.—[*Inrolled in the Petty Bag Office, February*, 1846.]

Specification drawn by Messrs. Newton and Son.

To THOMAS PEMBERTON, jun., *of Birmingham, in the county of Warwick, manufacturer, for a new or improved method or new or improved methods of ornamenting window furniture and articles of upholstery in general.*—[Sealed 25th February, 1846.]

THIS invention consists, firstly, in ornamenting window furniture, and articles of upholstery in general, by constructing the fringe thereof either wholly or partly of metal, or of metal combined with glass, porcelain, earthenware, or other vitreous or semi-vitreous substances, or of metal combined with silk, worsted, or other fibrous substances. Secondly, in constructing those parts of window furniture and articles of upholstery which are or may be made of metal, in imitation of ropes and tassels; and also in substituting parts or ornaments, formed in imitation of ropes and tassels, and made of metal, or of metal combined with glass, china, earthenware, or other vitreous or semi-vitreous substances, or of metal combined with silk, worsted, or other fibrous substances, in place of the ropes and tassels usually employed in window furniture and articles of upholstery.

In Plate XIII., is a view of a window provided with window furniture, and shewing the application of both the above improvements. One mode of carrying into effect the first part of this invention is represented at *a*. Those parts of the fringe marked *b*, are made of silk, worsted, or other fibrous substances; and the hangers *c*, which are usually formed of wood, covered with silk, worsted, or other fibrous materials, are made of brass or other metal or metallic alloy, either alone or combined with glass, china, earthenware, or other vitreous or semi-vitreous substances, or with silk, worsted, or other fibrous materials. If preferred, the whole of the fringe may be composed of metal hangers, or of hangers made of metal combined with glass, china, &c., or with silk, worsted, &c.; and the patentee sometimes forms the links, or those parts of the fringe marked *d*, of brass or other metal or metallic alloy, or of metal combined with glass, china, &c. &c.

The application of the second part of this invention is exhibited at *e*, e^1, *f*, *g*, in the elevation above mentioned. *e*, is a substitute for the ordinary curtain-band used for supporting window curtains; it consists of a pin, fixed in the window frame, and decorated with a metallic ornament, in imitation of a rope and tassel. e^1, represents (partly in dotted lines) a substitute for the rope and tassel sometimes used for supporting window curtains; it is made of metal, in imitation of a rope and tassel, and holds the curtains in the same manner as the ordinary rope and tassel. *f*, *f*, are cornice ends, formed with metallic ornaments, representing ropes and tassels; and *g*, *g*, are curtain rings, made in imitation of ropes.

The first part of this invention is applicable to fringes of all sizes and kinds; and the second part is applicable to cornice or curtain poles, cornice ends, pole rings, cornice brackets, curtain pins, or bands, or holders, and other articles for supporting curtains, festoon rings, and bell ropes.

The patentee claims, Firstly,—the ornamenting of window furniture, and articles of upholstery in general, by constructing the fringe used in the said window furniture and articles of upholstery either wholly or in part of metal, or of metal combined with glass, porcelain, earthenware, or other vitreous or semi-vitreous substances, or of metal combined with silk, worsted, or other fibrous substances, as above described. Secondly,—the constructing of those parts of window furniture and articles of upholstery which are or may be made of metal, in imitation of rope or ropes and tassels; and also substituting parts or ornaments of metal, or of metal combined with glass, china, earthenware, or other vitreous or semi-vitreous substances, or of metal combined with silk, worsted, or other fibrous substances, in place of the rope or ropes and tassels usually employed in window furniture and articles of upholstery; the said parts or ornaments being made in imitation of rope or ropes and tassels, as above described.—[*Inrolled in the Inrolment Office, August,* 1846.]

To HENRY MANDEVILLE MEADE, *of the city of New York, in the United States of America, Gent., for improvements in preparing food for animals when Indian corn is used,—being a communication.*—[Sealed 15th April, 1846.]

THIS invention relates to the feeding of cows, sheep, pigs, and other animals, with Indian corn, and consists in employing for that purpose not only the grain of the Indian corn, which has been heretofore used, but also the cone (or as it is generally termed the "cob") on which the grain grows; these are ground together, or else ground separately and afterwards combined, and the compound product, thus obtained, may be used for feeding animals, either in a dry state or mixed with water.

The grain of Indian corn alone, or the meal produced from the grain, is said to be a substance unsuited for feeding animals upon continuously, as their chief or only food; but when the grain is combined with the ground cones or cobs, the product forms a good article for the general and continuous feeding of animals; and this combination may be advantageously used for fattening animals, in consequence of its cheapness and highly nutritious qualities.

The patentee claims the combining of the meal of the grain with the ground cones (called cobs), in preparing food for animals when Indian corn is used.—[*Inrolled in the Inrolment Office, October,* 1846.]

To Godfrey Woone, *of Kensington, in the county of Middlesex, Gent., for certain improvements in the art of engraving in relief.*—[Sealed 11th March, 1846.]

This invention consists in certain improvements in the formation of engraved surfaces, having the character of wood engravings or types, and applicable to the production of prints and illustrations of books, and to the printing of paper-hangings, cotton, silk, and other fabrics; the impressions presenting the appearance of tinted copper or steel-plate engravings, or tinted lithographs.

These improvements are classed under three heads, viz., first, the direct modes of engraving, or those by which the engraving is formed directly upon the plate from which the impressions are to be taken; secondly, the indirect modes, or those by which an engraving in relief is obtained on some material or substance that is not sufficiently hard to print from, and is therefore used as an original to take casts from, fit for printing; thirdly, the intaglio mode, or that by which the printing surface is obtained from a mould in a substance coming under either the first or second of the above heads.

Under the first part of the invention five new kinds of tools are described, and certain methods of breaking up the etching ground are explained. The first tool is made by taking a steel plate, one-fourth of an inch thick, and laying on it a mezzotinto ground; the second tool consists of a steel plate, on which an aquatinto ground is bitten, in such a manner that, if printed from, it would yield impressions entirely black; the third tool is formed by "machining" two sets of lines diagonally across a copper plate, at right angles to each other, and biting in to a considerable depth, so as to leave a surface of dots; the fourth tool is made by taking from the last-mentioned plate an electrotype cast, one-fourth of an inch thick, the surface of which will present the appearance of a square network; and the fifth tool consists of wire-gauze:—for a medium ground, the gauze should be about eighty squares to the inch. The patentee says that these tools have never before, to his knowledge, been used for a similar purpose; and he therefore claims the right of using them in the ordinary process of copper-plate engraving.

The mode of employing these tools is as follows:—Upon a copper plate, of the required size, an ordinary etching ground is laid, and the patentee, having selected one of the tools (which he slightly rubs with black lead, to prevent adhesion), places the etching ground side of the plate and the prepared side of the tool in contact, and passes them through a copper-plate press; on carefully separating them, the etching-ground will be found to be broken up into infinitely small particles; and a tracing of the design is then made upon it, in the usual manner. The parts intended to print entirely black are now covered, by means of a camel's-hair brush, with a mixture of Brunswick black and spirit of turpentine; and when this is dry, the plate is placed in the decomposition cell of a galvanic battery;—the patentee does not lay claim to any novelty in this part of the process, but to the means he employs for localizing the decomposing galvanic action, and producing thereby new and peculiar effects. The plate is to remain in the cell from five to twenty minutes, according to the intensity of the action and the depth required. When the unprotected parts are slightly indented, they will form the next dark shade to black; the plate is then to be taken out, washed, and dried, and those parts of the design which are to be of this shade are covered with the above-mentioned stopping-out mixture, and the plate is replaced in the cell, and retained there for a sufficient time to produce the next shade required; these operations are repeated for every variety of shade intended to be given to the picture. A very fine effect, in imitation of tinted lithography, is stated to be produced by drawing the whole subject in at once to print in black lines, scraping or removing with a point the lines or part desired to print white, and subjecting the plate to the galvanic action until a middle or medium tint between black and white is obtained. Plates of any metal liable to galvanic decomposition may be treated according to this part of the invention. The plates, when finished, are fastened on blocks of wood of a suitable height to enable them to be worked with printing types.

The second direct method consists in reversing the ordinary mode of stipple engraving. The patentee says that he finds this mode capable of producing engravings in relief with great delicacy, especially if employed in conjunction with the other methods constituting this invention.

The indirect modes of producing engravings in relief are as follows:—One of the tools above described is heated, and upon it white wax is spread, so as to produce an even surface, by filling up all the rough or uneven parts; on this, the design is traced, and the subject is drawn with a mixture of vermillion and gum-water; when dry, turpentine is employed to remove the ground, except where protected by the vermillion, which is afterwards to be washed off with water. A cast taken from such a prepared plate will produce black lines on a middle tint; and nothing further remains to be done but to engrave any light lines or spaces required. Originals to cast from, or surfaces which may be employed at once to print from, may be made by covering a lithographic stone with an etching ground, and breaking it up by one of the tools above described; the drawing must then be proceeded with in the same manner as under the first mode, but instead of the galvanic operation it will be necessary to employ acid.

The third part of this invention, or the intaglio mode, consists in throwing a middle tint entirely over grounds in the methods lately introduced of producing a printing surface in relief, by casting or taking an electrotype impression from moulds formed by drawing or etching through a composition down to a base of metal: this may be done by machining lines entirely across the plate, or employing one of the beforementioned tools for throwing a tint over the entire plate.—[*Inrolled in the Inrolment Office, September,* 1846.]

To HENRY HIGHTON, *of Rugby, in the county of Warwick, Master of Arts, for improvements in electric telegraphs.*—[Sealed 3rd February, 1846.]

THIS invention consists in communicating signals by the motions produced in strips of metallic leaf by passing electric currents through them.

A signal apparatus, constructed on this principle, is shewn in Plate XIII. It consists of a glass tube *a,* furnished with brass caps *b, b,* at top and bottom, which are connected with the wires *c, c,* employed for conveying the currents of electricity. *d,* is a strip of metallic leaf (gold leaf is the kind of metallic leaf generally used by the patentee), suspended loosely between the two brass-caps, and in metallic contact therewith; the upper end of the metallic leaf is fixed at right angles to its lower end, so that the leaf, from whatever direction it is seen, will present some part of its flat surface to the eye. Near to the metallic leaf (as on the outside of the glass) is placed either of the poles of a magnet. The effect of this arrangement is, that when a current of electricity is caused to pass through the circuit, and therefore through the metallic leaf *d,* included in it, the leaf *d,* is deflected to one side or the other, according to the direction of the current; and the motions thus produced may be repeated and combined, and used for the purpose of indicating letters, figures, or other conventional signals.

One signal apparatus, of the above construction, is placed at each terminus of telegraphic communication, and others may be placed at intermediate points. Each terminus and each intermediate station is provided with a voltaic battery, and with one of the key-boards used with "single magnetic-needle electric telegraphs." The attendant at either terminus, or at any intermediate station, makes the requisite connections for causing an electric current to pass in either direction through the circuit, and therefore through the metallic leaf of the signal apparatus at each station, thus causing the metallic leaf of every apparatus to move simultaneously to either side, so as to give the desired signal. The key-board of each station has a handle, by moving which an electric current is caused to pass through a circuit in connection with a system of alarums at the terminal and intermediate stations, similar to those in use with magnetic-needle electric telegraphs.

The patentee claims, Firstly,—the application of metallic leaf for giving signals in electric telegraphs. Secondly,—the combining into one system of electric telegraphs, so as to act together, two or more apparatus adapted for giving signals at different places by means of metallic leaf. Thirdly,—the combining of alarum apparatus in electric telegraphs with apparatus for giving signals by means of metallic leaf.—[*Inrolled in the Petty Bag Office, August,* 1846.]

To JAMES PALMER BUDD, *of Ystalyfera Iron Works, Swansea, merchant, for improvements in the manufacture of iron.*—[Sealed 16th January, 1845.]

THIS invention relates to the employment of the flame from blast furnaces for heating the air which is supplied to such furnaces, and thus reducing the cost of making iron. The improvements consist in making lateral openings out of a blast furnace into a contiguous chamber, furnished with a chimney or means of obtaining a draft, and placing suitable pipes or apparatus for the passage of the blast of air, in order that the same may be heated and conducted from the heating apparatus to the tuyeres.

The mode of carrying out this invention is as follows:—

Two rows of three, four, or more openings are made around the blast furnace, and there is a flue formed for each row, to conduct the flame, that passes out of the furnace through the openings, into an adjoining chamber, containing the apparatus for heating the blast of air; such chamber being built as near as possible to the furnace, so that the flame may pass freely into it, and being closed at all parts, except where it opens into a flue or chimney, which should rise above the tunnel-head of the furnace, for the purpose of creating a good draft through the chamber. In order that the interior of the chamber may be easily repaired, a door is provided at any convenient part; and if the chamber should get too hot, by opening this door the draft will be reduced, and the heat of the chamber will be of course diminished.

When several blast furnaces are built close together, a chamber is constructed between every two adjoining furnaces; and in this case the flues leading from the openings to the chamber will not pass all round each furnace, but each set of flues will extend half round, so as to conduct the flame, that passes out of half the above-mentioned openings, to a chamber between the two furnaces; the flame issuing from the remainder of the openings being conveyed, by another set of flues, to a chamber on the opposite side of the furnace: thus the flame will not have to travel so far as when the flues entirely surround the furnace and conduct the whole of the flame into one chamber. Where this arrangement is adopted, the patentee prefers that the heated blast from the several chambers should pass into one main pipe, and thence to the tuyeres of the different furnaces. He states, with regard to the openings in the blast furnace, that twelve openings, eighteen inches high and eighteen inches wide, leading into two flues around the furnace, above the boshes and below the tunnel-head, are sufficient; the flues opening into a chamber of a suitable size for containing the requisite pipes or apparatus for heating the air.

The patentee says he is aware that it has before been proposed to form lateral openings out from blast furnaces, for the purpose of conducting off, by means of pipes or passages, the gaseous products from the upper part of the furnaces, with a view of obtaining inflammable gas, to be ignited at a distance from the furnace from which the products are taken; he does not, therefore, claim the making lateral openings in blast furnaces, unless combined with a chamber or chambers, so contiguous to the blast furnace that the flame from the furnace, by the aid of the draft through the chamber or chambers, may pass amongst and heat the pipes or apparatus contained therein, through which the blast of air is passed to be heated. He is also aware that it is not new to heat air for the purpose of hot blast by means of the flame passing off from a blast furnace, as pipes or apparatus have been applied to or over the tunnel-head of the furnace; and he is likewise aware that the heat of the lower part of a blast furnace has been applied as a means of heating air, by placing pipes or apparatus in the interior of the brick-work or masonry at that part; but in such case there were no openings from the interior to the exterior of the furnace, nor any means of obtaining draft, to cause the flame to pass laterally out of the furnace. What he claims is, the mode of heating air for the manufacture of iron, as above described, whereby the flame passes out laterally from a blast furnace into an adjacent chamber or chambers, containing suitable pipes or apparatus for the passage of the blast; the flame being urged through the chamber or chambers by the draft of a chimney or other means.—[*Inrolled in the Inrolment Office, July,* 1845.]

To JAMES PALMER BUDD, *of Ystalyfera Iron-works, Swansea, merchant, for improvements in the manufacture of iron.* [Sealed 11th February, 1846.]

THIS invention consists in the application of clinkers, produced by the combustion of coal, to the manufacture of iron.

The clinkers may be obtained from works where large quantities of coal are burned in furnaces or smiths' fires; also from the waste heaps of small coal, which have been burned down at various coal-mines, in order to reduce the bulk of such heaps; and from the waste ash-heaps of various manufactories, which having been burned down, a substratum of clinkers is formed near the bottom of the heaps. Clinkers, being of a light porous nature, and containing a large proportion of earthy matters, are peculiarly suitable for use in the blast-furnace with the rich oxides of iron, whether the latter consist of the cinders obtained in the various branches of the manufacture of malleable iron, or of the rich iron ores called hematites, which are of great specific gravity, and contain only a small proportion of earthy matters. The advantages arising from the admixture of the clinkers with the rich oxides of iron in the furnace are, that they will lessen the density of the whole, and facilitate the passage of the blast, and also supply the proportion of earthy matters required for the perfect separation of the iron.

In charging the blast-furnace, the patentee generally combines the clinkers with rich iron-stone, cinder, or ore: as the quantity of iron contained in different kinds of clinkers varies, exact directions cannot be given for the use of every quality of clinker; but the rule laid down by the patentee is, that if the clinkers are rich in iron, he employs a less quantity thereof than when they are comparatively poor; and he combines the iron-stone, cinder, or ore with the clinkers in such a manner, that the charge fed into the furnace will contain less than fifty per cent. of iron. In all cases where the clinkers have less than forty-five per cent. of iron, a richer material, such as the cinder of malleable iron-works, or rich iron ore, should be used therewith, to bring up the iron in the charge to about that per centage; but if the clinkers contain from forty to fifty per cent. of iron, a mixture of richer materials is not necessary, and clinkers may also be used alone, when it is inconvenient to mix other materials with them. When the furnace is being charged with the mixture of clinkers and ore, or clinkers alone, the fuel and fluxes are added in the same manner as if ores of a like per centage were being operated upon.

The patentee claims the application of clinkers, arising from the combustion of coal, in the manufacture of iron.—[*Inrolled in the Inrolment Office, August,* 1846.]

Scientific Notices.

ON THE MANUFACTURE OF ARTIFICIAL GUM.

BY M. EMILE THOMAS, CHEMIST.

[Translated from the "Bulletin de la Société d'Encouragement," for the London Journal of Arts.]

During a lengthy stay in England, I had occasion to occupy myself with the manufacture of artificial gums. The facts which I collected, either from my own observations or from official communications, may, I trust, prove somewhat interesting to the Society of Encouragement, and I therefore hasten to communicate the same.

Since the discovery of diastase by Messrs. Payen and Persoz, and owing to the successful applications, made by the former of these gentlemen, of the various products made from starch under the influence of that powerful re-agent, a new discovery has been made in this branch of industry—viz., dextrine or artificial gum.

During the last two years, especially, the manufacture of dextrine has made immense progress in France, England, and Germany. I will not here recapitulate the various uses to which this product may be advantageously applied, but I would observe that the rapid development of a new branch of industry nearly always occasions, as in the present instance, the substitution of an economical product, of an easy and quick manufacture, for an expensive product, obtained by an uncertain manufacture.

In this case, dextrine has replaced exotic gum for nearly all the purposes to which it was applied.

Dextrine is now met with in commerce in three distinct forms, viz.: in the form of a white, brilliant, and pearly powder; as a syrupy solution; and in the form of exotic gum, in greater or less perfection, either broken into small fragments, or made into rolls of various sizes.

Some short time ago dextrine was only produced in the state of powder; and if some manufacturers have sought to give to it the appearance of the product for which it is to be substituted, they may have been induced to do so from the conviction that the only way to supersede the old plan was by humouring and even deceiving its disciples with the outward appearance of the new product. In this way our learned professor, M. Payen, who was formerly a manufacturer of some eminence, introduced borax of French manufacture, by giving it the dusty appearance of the Dutch crystals of borax, rounded and polished by the friction during their conveyance.

It has since been discovered that the gummy form of dextrine possessed many great advantages not at first contemplated. I shall allude to this presently, but would first observe that there appears to be one disadvantage attending this form. Some intelligent persons were apprehensive that taking advantage of the resemblance, exotic gum would be adulterated with artificial gum; fortunately this is impracticable, as the smell and taste of potatoe oil which is always given out by artificial gum, are sufficient to betray its presence, and thus, if the purchaser suspects a fraud, he can easily detect it.

Dextrine may be manufactured either by the use of acids, or by means of the diastase contained in malted barley. I will examine these various processes in succession.

By sulphuric acid.—The dextrine produced possesses the disadvantageous property of being deliquescent, *i.e.*, absorbing the humidity of the atmosphere; this method is therefore never employed, as, besides this disadvantage, the products are often colored.

By azotic acid.—This method is now most generally followed for obtaining dextrine in the state of powder. I have thought proper to observe on this head, that the acid employed must be perfectly pure, and for this reason,—that azotic acid, as is well-known, is obtained by the decomposition of nitrate of soda, obtained in the natural state from the coast of Bolivia, by means of sulphuric acid; now this salt always contains a portion of sea salt, which, together with the sulphuric acid and azotic acid, generates chlorine. Although but a small portion of this chlorine is contained in the acid, and consequently in much less proportion in the dextrine produced by that acid, it is nevertheless sufficient to considerably diminish the brilliancy and depth of the colours prepared with the dextrine: several printers upon paper and fabrics have observed this, without being able to account for it otherwise than by attributing it to the inferior quality of the gum.

By hydrochloric acid.—This process is only employed to my knowledge by Messrs. Saint Etienne, who first render the starch soluble, as in the former process, by means of a small dose of acid, and by torrefaction, or rather dessication, at a high temperature.

The powder, thus obtained, is afterwards thrown upon a metallic sieve, and submitted to the action of a jet of steam, which damps the dextrine to such an extent, as to render it transparent, without liquefying it; so that it will require but very little drying afterwards. This process possesses the disadvantage of requiring great ability on the part of the workman charged with the hydration of the dextrine: the manipulation necessary for this operation is not acquired without great difficulty, so much so, indeed, that M. Saint Etienne, junior, who directs the working of his process in England, has not yet been able to find any person capable of undertaking this part of the work. Messrs. Saint Etienne prefer to use hydrochloric acid.

By diastase.—This process seems the most worthy of attention in all respects, as by adapting to it some modifications, which I have tried on a large scale, it will be found to be the one giving the most perfect results; I will therefore describe it fully.

The fecula must be rendered soluble in vats, heated by steam in such a manner that the temperature may be easily raised or lowered. The fecula is first mixed with four times its weight of water, previously heated to about 50°; for this purpose the fecula is gradually introduced into the vessel or boiler containing the hot water. In London, I employed copper boilers, with a double bottom, capable of containing about 400 gallons; and at one operation, about 600lbs. of fecula, mixed with 1200 quarts of water, were decomposed. The temperature must be kept at about 60°, until the whole mass is converted into starch; 2 per cent. by weight of very white malted barley is then added, and also the mucilage produced from 1 per cent. of linseed.

If a greater proportion of malt than that I have mentioned were added, the decomposition would, doubtless, be more rapid; but a larger quantity of glucose would be formed, and the gum would be more colored. With regard to the utility of the mucilage of linseed, it imparts tenacity to the gum. Instead of this substance I attempted to use lichen, but it did not answer, although the products were much whiter, by reason of the mucilage depositing itself upon the sides of the boiler, and preventing the liquid from boiling; it is besides not so strong as the linseed mucilage.

The mixture must be kept at a temperature of about 50° or 60°, until all the starch is again dissolved; the temperature should then be suddenly raised, taking care, however, not to exceed 75° centigrades, but keeping as near that temperature as possible, in order to cause the diastase to act as powerfully as possible. It will then be necessary to well stir the mixture, until the decomposition is almost complete; this may be ascertained by the deep blue tint the mixture assumes, and by the action of the solution of iodine, which, in that case, will color the dextrine of a violet, approaching to red, without any mixture of blue.

It is unnecessary to say, that, during the decomposition, the liquid must be kept constantly in motion. The operation lasts about an hour and a quarter, that is to say, a quarter of an hour for the formation of the paste, one for its dissolution, and the other three quarters for rendering it soluble.

I much prefer this method of forming the paste before adding the malt, as the re-agent spreads much more uniformly throughout the mass, and does not at once fall to the bottom of the vessel in which the operation is performed.

The liquor must now be removed from the decomposing vats, and left in pans to settle, for from six to eighteen hours, according to the exterior temperature. During this time a slight fermentation will be perceptible, but it must be checked by adding alum, in the proportion of 10 grammes for every 25 gallons of liquid. It is essential to allow this time for the mixture to settle, as it prevents two serious evils, viz.: the coloring of the gum while baking, and a singular phenomenon so often observed in evaporating viscous liquids, viz., their being quite still, and which I have ascertained is caused by the formation of a very thick sediment on the sides of the evaporating vessels.

The liquor when drawn off, after settling, will mark about 10° Baumé, and it is evaporated by raising it very slowly to the boiling point, which precaution is indispensable; for the perfect clarification is accelerated by checking the first boiling, as in refining sugar: this clarification is effected without any foreign agent, by the coagulation of the vegetable albumen contained in the malt, and the linseed mucilage. As scum will continue to rise to the top of the mucilaginous syrup during most of the time of baking, it will be necessary to carefully remove it: and if the boiling is too much accelerated, the gum will first become thick, and afterwards will be colored. When a solid pellicle of gum is formed at the surface of the syrup, the baking will be completed, at which time the syrup will mark about 35° Baumé.

If it be desired to keep the gum in a liquid form, the baking must be stopped at 30° while boiling; the syrup must then be poured into well closed vessels, previously rubbed with essence of turpentine, and the surface of the gum covered with a thin layer of that essence: this method succeeded pretty well for preventing the fermentation of the liquid gum.

When it is desired to solidify the gum, the boiling syrup is poured into small flat tin vessels, placed upon a hot air stove, kept at a temperature of from 40° to 50° centigrades. At the end of 24 hours the gum will acquire the consistency of jujube paste; it is then cut up into small oblong pieces with a pair of shears, and these pieces are rolled out upon a polished table, with a wooden roller, dusted with pulverized artificial gum, and afterwards placed upon wooden frames, and left for three or four days to dry. The gum would be much better dried by letting the syrup run upon a cylinder, heated to 110° or 120°, but the economy of this process is questionable. The artificial gum thus prepared is easily dissolved, and makes a very clear solution: over dextrine, in the state of powder, it possesses the advantage of being more readily packed; and over liquid gum, the advantage of not fermenting.

The experiments which I have made with the various products of starch, have led me to other enquiries upon analogous substances, and principally upon ligneous and cellular fibre, which, as is well known, according to the experiments of M. Payen, are of the same formation as starch. At a future meeting, I hope to communicate to the Society the results of some experiments upon the steeping of textile fibres, by means of processes analogous to those employed in manufacturing dextrine, or sugar.

I will conclude by some observations upon an improvement which may be introduced in the manufacture of starch by washing. In the manufactory at Habertonford Mills, in the county of Devon, where M. Saint Etienne is superintendent, he is occupied in the production of starch, by M. E. Martin's process, which consists, as is well known, in washing the paste, obtained by means of wheaten flour, under the action of a current of water, and a mechanical softener. For this process it is essential that flour may be easily procured. Not having this facility, M. Saint Etienne conceived the idea of steeping the grain whole in water for two or three days, and then crushing it between rollers, and thus forming the paste. But this method was attended with a serious evil, viz., that the starch was not deposited, especially in summer. M. Saint Etienne attributed this to the quality of the water, but I convinced him that it was owing to the fermentation and partial germination of the corn, which, being so long in contact with the water, formed successively diastase and dextrine, and thus rendered the water, which was used for washing the starch, viscous. At my suggestion he constructed an apparatus of wood, lined with lead, and having filled it three parts full of corn, he then added water sufficient to cover it. This apparatus was submitted to a constant heat of 50° centigrades as the maximum, with a pressure of from 15 to 20 atmospheres, and in four or five hours the grain swelled so as to completely fill the apparatus. A great quantity of water being thus absorbed, a paste could easily be formed by passing it between wooden rollers. Paste thus obtained may be used for making starch, care being taken to leave it to settle for two hours longer than the paste made with flour, before softening it: there is then less fear of fermentation, and about 10 per cent. more available paste will be obtained than by grinding.

REPORT MADE BY M. SILVESTRE, JUN., IN THE NAME OF THE COMMITTEE OF ECONOMICAL ARTS, ON M. GOUBAUD'S APPARATUS FOR MAKING ICE.

Up to the year 1845, not one of the processes proposed for producing artificial ice, by means of refrigerating mixtures, had been usefully employed for domestic purposes. The Society for Encouragement, therefore, taking into consideration the numerous advantages offered by the great improvements made in scientific researches, thought fit at that period to call the attention of the public again to this interesting question, and proposed a prize for the best apparatus.

As the end to be obtained was to furnish families with the means of producing ice in localities where it could not be easily procured in the natural state, it was deemed necessary to prohibit the employment of pounded ice, and also of any substance, the use of which might be attended with danger in inexperienced hands.

Several persons have endeavoured to obtain the result required, but only one has complied with the directions of the Society. The refrigerating apparatus submitted to your judgment by M. Goubaud, and which you have referred to the Committee of Economical Arts, has for its object the production of ice from water, without employing pounded ice, or any substance in using which danger is to be apprehended.

The result stated by the inventor to have been attained appeared so satisfactory to your Committee, that, without delay, they examined the apparatus in question, and made the experiments necessary to enable them to test its advantages.

You have already seen, at a recent meeting, that M. Goubaud's refrigerator is very simple, both in its construction and mode of working, and that by means of a mixture of salts and water it produces ice in a short time, and in sufficient quantities for domestic purposes. In addition to this it may be as well to state, that the salts necessary for producing the frigerific mixture may be anywhere readily procured, and that the substances employed may be intrusted, without danger, to the most inexperienced person.

It therefore only remains to ascertain whether the cost of the ice, as stated by the inventor, had been calculated with reference to processes simple and capable of being carried into effect by any party; or whether it was not (as is frequently the case) the result of certain delicate chemical operations.

The refrigerator, which has been referred to the Committee of Economical Arts, is an apparatus of convenient size, composed of twelve tubes; for the operation, about 2500 grammes of salts and five pints of common water, at a temperature of about 12 degrees, are required; by means of which about 500 grammes of water are congealed, at the same temperature, by a single operation, which lasts from fifteen to eighteen minutes.

Several experiments were made by your Committee with this apparatus, not strictly according to the rules of science, but with all the care which it is possible to give to these kind of operations.

The following were the average results obtained:—Loss upon the whole of the salt, after each experiment, 24 grammes, or 9.6 grammes per kilogramme; and in value 8.4 centimes for the whole, or 3.4 centimes per kilogramme.

With regard to the expense occasioned by the revivification of the saline mixture, very great precautions were taken by the Committee for ascertaining this expense.* The quantity of charcoal employed in the evaporation of the saline liquor has been found to average, 1,270 grammes, worth about 19 centimes.*

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* It must be remembered that the revivification of the salt takes place after each operation.

If it be supposed that the refrigerator lasts ten years, and is worked on an average five times per week during five months, the purchasing price being 38 fr., the loss occasioned by the use of the apparatus, including the interest of the capital engaged in the purchase, is about 5 centimes each operation.

The cost of the 500 grammes of ice is therefore, in Paris, 32 centimes, or 64 centimes per kilogramme.†

I must however say, that a considerable diminution in the expense of combustible will be obtained;—1st. If instead of revivifying after each operation, a sufficient provision of salt is made to submit larger quantities of the solution to evaporation, as, for example, from 6 to 8 gallons;—2ndly. When, instead of employing wood-charcoal, a less expensive combustible is used;—3rdly. When a portion of the caloric lost in working is employed in concentrating the solutions;—4thly. If the heat of the sun be employed for the concentration and crystallization;—Lastly, if a furnace be employed, constructed in such a manner as to expose the whole superficies of the boiler to the direct action of the fire-place; which arrangement will be the more advantageous, as the liquid to be evaporated is, of all saline solutions, that requiring the most caloric to attain the boiling point.

It cannot be denied, that by employing at the same time, if possible, the easy means of evaporation just mentioned, a great diminution in the cost of fuel might be effected.

On the other hand, the salts which M. Goubaud employs, and which are sold at about 1*s.* 6*d.* per lb., will necessarily diminish in value immediately it becomes necessary to manufacture on a large scale, which is already being done.

It appeared to your Committee that the price of the refrigerator was rather too high; and it will no doubt be possible to reduce the cost considerably. At any rate, several advantageous modifications may be made without increasing the price.

From the foregoing, the Committee of Economical Arts estimates the cost price of the ice, per lb., may be very reasonably estimated at 33 centimes, given by the inventor, and even as low as 30 centimes, required by the Society. It is therefore to be desired, that from the present time up to the period when the Society shall close its discussions on the subject of refrigerating apparatus, M. Goubaud would exert himself to furnish precise information on the means by which the public may easily obtain ice at the terms imposed by the programme. The Committee is therefore of opinion that M. Goubaud's apparatus may from this time render essential service in domestic economy, and that a very advantageous use may be made of it, under certain circumstances, for medical purposes.

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* In Paris, charcoal is sold at an average price of 15 centimes.

† This cost price, calculated in Paris, where fuel is dear, may be considered as the maximum price. Besides, M. Goubaud manufactures his apparatus less for Paris and the large towns, where ice is very cheap, than for the numerous localities, where it is not to be procured without great difficulty, and where, in order to effect the revivification of the salts, very easy and cheap means are used.

BECKMAN'S HISTORY OF INVENTIONS.*

This curious work, which has hitherto been little known, except to the antiquary, is now presented in a more popular form, and with the additions made by the editors (Messrs. Francis and Griffiths), is capable of affording considerable information of a character very interesting to the general reader. In our opinion, a work upon inventions and discoveries, without a plan, is certainly divested of a most important feature, but from the position of our author, and the time in which he lived, he was precluded from giving other information on the arts than that which he has thrown together. We must, therefore, look upon his work as a miscellany, the result of great patience and research, and containing such information as would for the most part have been lost to the world, from the mere fact of its scattered state. Neither must we criticise with too much severity the strange variety of subjects, a knowledge of which the author, in the simplicity of his heart, has thought it desirable to preserve;—corn-mills and cock-fighting,—pawnbroking and paving streets,—do not, according to our modern rules, bear any relation to each other; but while considering the purport of the work, viz., to rescue a variety of scattered information from foundering in the lapse of time, we cannot too highly estimate our author's exertions, more especially as no fame was to be gained from his labours, although in other paths of literature he had the learning and abilities to attain great things.

It must ever be a source of regret, that in an earlier age no Beckman lived to chronicle the many inventions which are now lost to the world. Some little light, through the medium of the hieroglyphics, is just glimmering upon us, of the means which the Egyptians possessed of raising their stupendous structures; but to come to a more recent period, where shall we look for the methods once so generally practised in Europe of staining glass, the brilliancy of which, with all our modern skill in chemistry, cannot be approached! And again, with respect to fresco painting, it is melancholy to reflect on the failures which our artists must experience, perhaps, to the sacrifice of their best works, before sufficient knowledge can be attained to make the efforts of their minds and pencils enduring: a page or two in such a miscellany as Beckman's might have revealed the secrets of the art, which may, for many years, baffle the pursuit of the most industrious enquirer.

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* 2 Vols.—Bohn's Standard Library.

The edition now before us has been judiciously amplified, to bring the most interesting branches of the arts to their present state of perfection. What has been done to this end cannot be said to bear the stamp of great erudition, but for a popular book, the outline of the improvements may be considered sufficient. We should be glad if this might be considered the forerunner of a popular treatise, by well chosen writers, on the manufacturing arts, as the general ignorance on such subjects is more detrimental to the arts themselves than many persons imagine; but if no such idea is entertained by the publisher, we must thank him for this effort to instruct, and patiently await the rising of a modern Beckman.

EXPLOSIVE COTTON.

In our last Number, p. 209, we noticed the production, before the British Association at Southampton, of a prepared cotton, possessing explosive qualities in a greater degree than gunpowder. At the time of this exhibition it was considered inexpedient to divulge the secret of the inventor, Professor Schoenbein, as patents for the discovery were being sought in this country; but no sooner was the idea of explosive or fulminating cotton made known, than, like the mystery of Columbus's egg, it was found that every one possessed the knowledge of obtaining a similar result. Subsequently to the publication of our notice, the periodical press, both at home and abroad, has poured upon the world a host of claimants for this discovery, all of whom embody, in different modes and proportions, the elements of which gunpowder consists. Whether or not these plans really embrace the elementary features of Professor Schoenbein's preparation of gun cotton remains to be seen, when the patent obtained by Mr. John Taylor "for improvements in the manufacture of explosive compounds" (communicated to him, as we understand, from Professor Schoenbein) is specified. As this patent passed the Great Seal of England on the 8th October, and all the processes by which explosive cotton has been prepared, by the correspondents of the several newspapers and journals, were not made public until after that date, the invention, even if developed, is yet quite safe in point of law; for no private experiments or secret employment by other persons of the explosive material, will effect the patentee's right to the invention, as being the first to introduce it to this country. In the mean time the elaborate experiments which are being carried on and published by enthusiasts in the new art may be made available for the exclusive use of the patentee, who, embodying all their suggestions in his specification, has the power of shutting them out alike from fame and profit in their researches.

We select the following from among the many rival claimants to this discovery, all of whom appear to have come into the field after Professor Schoenbein, whose experiments have been the subject of much conversation on the continent for the last two months. We cannot therefore dismiss the idea that a fact being known, the means of arriving at a similar result was almost obvious; though it must be admitted that the coincidence of similar inventions having come to light at the same moment, even in remote parts of the world, is by no means without a parallel:—

Dr. Otto, Professor of Chemistry in Brunswick, has published the following statement in the *Hanoverian Gazette*:—"Entirely independent of Schoenbein and Bœttger, but relying on an observation of Pelouze, contained in the 136th page of the first volume of my *Manual of Chemistry*, I have succeeded in producing an exploding cotton, which, after a series of experiments, seems quite suited to supply the place of gunpowder. In order to bring the results of important discoveries as speedily as possible to the highest state of perfection, it seems to me necessary to lay them immediately before the public, in order that many persons may turn their attention to the subject. I scorn, therefore, to sell or take out a patent for my very interesting discovery, the consequences of which are not easy to be foreseen; and I now publish it for the general good of the public. In the preparation of the exploding cotton, common well-cleaned cotton is dipped for about half-a-minute in highly concentrated nitric acid (the acid which I use being made by the distillation of ten parts of dried saltpetre and six of oil of vitriol), and then instantly placed in water, which must be often removed, in order to free the cotton from the acid with which it is impregnated. Care must then be taken that all the knotty particles of the cotton are properly disentangled, and that it is thoroughly dried. After this, the explosive preparation is ready for use; its effects create astonishment in all who witness them, and the smallest portion explodes when struck on an anvil with a hammer, like fulminating powder; when kindled with a glowing body, it takes fire just like gunpowder; and when used in a gun, its operation, though in a far greater proportion to its weight, is precisely the same as that of gunpowder. This gun-cotton is employed exactly in the same way as gunpowder; a piece of it is rammed down the barrel, then a bit of wadding, and after that a ball; a copper cap ignites and explodes the cotton. Without a single exception, all who have witnessed my experiments have been most completely satisfied, but no one has mentioned the matter."

"*Brunswick, Oct. 5.*"

"The *Messager* states, that 'a trial of a fulminating matter, having all the appearance of cotton and wadding, and which the inventor, M. Morel, a mechanical engineer at Paris, designates under the name of fulminating cotton, has lately been made in presence of General Gourgaud, President of the Committee of Artillery, Colonel Piobert, member of the Academy of Sciences, and several other officers. M. Morel announced that he had, during a long time, been occupied with his invention, and that he had taken out a patent for the preparation of the composition which he submitted to trial. For this purpose he presented a box of cartridges ready prepared for small arms. Burned on the hand it causes no sensible pain, leaves no stain, and produces no smoke. Dipped in water and pressed, and afterwards dried between two leaves of blotting paper, it preserves its fulminating properties. General Gourgaud fired a charge of fulminating cotton from an ordinary fowling-piece, at a distance of 40 yards from the object at which he aimed. He fired a holster pistol at a distance of 25 yards, and a pocket pistol at a distance of 10 yards. At 40 yards, a ball from the fowling-piece traversed a plank of beech of 0.35 centimetres thickness; at 25 yards, the ball from the holster pistol lodged in the plank without perforating it; the ball from the pocket pistol made the same impression on the plank as that which might have been produced by a charge of ordinary gunpowder. The charge of fulminating cotton leaves scarcely any residue in the barrel. The recoil of the gun is extremely slight, and the report is not louder than that of a large detonating cap. We cannot calculate on the effect which may hereafter be produced by the discovery of M.

Morel. He has promised to prepare a quantity of fulminating cotton sufficient to make experiments with cannon. The effect already produced appears to coincide with those attributed by the English journals to the cotton powder of M. Schoenbein. M. Chodsko, a Polish refugee, likewise presented a fulminating substance, which has the appearance of cotton, and which was tried with an artillery musketoon, fired at 40 yards. The ball produced the same effect as that fired by fulminating cotton, but it left a considerable deposit in the barrel. The cotton powder of M. Chodsko was compressed into a wadding in order to charge the gun, whilst the fulminating cotton was not. Both materials ignite by the blow of a hammer on an anvil, but not by the blow of a hammer on wood.' "

(From the Times, October 28th.)

"Many persons have requested me to give minute directions as to the making of the explosive cotton, and the proportions that should be employed. The following forms a good quantity for a class experiment, and with ordinary care always succeeds:—Mix in any convenient glass vessel 1¼ ounce, by measure, of nitric acid (sp. gr., 1.45 to 1.50) with an equal quantity of sulphuric acid (sp. gr., 1.80). When the mixture has cooled, place 100 grs. of fine cotton wool in a Wedgewood mortar, pour the acid over it, and with a glass rod imbue the cotton as quickly as possible with the acid. As soon as the cotton is completely saturated, pour off the acid, and with the aid of a pestle quickly squeeze out as much of the acid from the cotton as possible. Throw the mass into a basinful of water, and thoroughly wash it, either in successive portions of water, or underneath a tap, until the cotton has not the slightest acid taste. Finally, squeeze it in a linen cloth, and dry it in a water bath. By employing a large relative proportion of the acids to the cotton, or by using stronger nitric acid, a still more highly explosive compound may be produced; but acid of the strength and in the proportions I have given affords a very useful article at a moderate cost. Nitric acid of the sp. gr. 1.50 answers much better than that of 1.45; it being a curious fact that the texture of the cotton is much less acted upon by the stronger acid. If the nitric acid has only the sp. gr. of 1.36, the cotton is often converted into a gelatinous mass, and I have no doubt but that in the majority of cases where persons have failed in repeating my process, the failure is owing to their nitric acid being too weak.—By the ordinary acid of commerce, I meant that of the *London Pharmacopœia*, which should be of the sp. gr. 1.50, but is seldom more than 1.45. When the very best cotton is required, it will be found advantageous to remove all adhering grease, by first washing the cotton in a weak alkaline solution, and thoroughly drying it before it is immersed in the acid. Being unwilling to detract in any way from the value of any other person's process without sufficient trial, I stated in my first communication that my process could only be regarded as a modification of that of Doctor Otto's; it is, however, something more, for I have carefully repeated Dr. Otto's process, using acid of the sp. gr. 1.512; and I may now venture to assert, that although a powerful explosive cotton is produced, it is much inferior in strength to that made with the addition of sulphuric acid. The practical difficulties, moreover, which would be encountered in manufacturing it by his process would be almost insurmountable; and if acid of a still greater strength were employed, the expense would prevent its ever being more than an object of scientific curiosity.

The cotton when well prepared should be perfectly white, and its microscopic structure quite unaltered. I have had so few opportunities of comparing the projectile power of gun cotton with that of gunpowder, that I am unable to make any positive statement either as to the precise charge that may be used with safety, or its relative force. It certainly may be made much stronger than gunpowder; I should therefore recommend any who may be disposed to try it, to begin with about a quarter of the weight which the gun requires when loaded with powder, and gradually increase the quantity until the proper charge is determined. I have fired 20 grains from an ordinary gun, when loaded with a bullet; and two grains and a half of a rather inferior cotton, in a two-grooved rifle, drove the bullet through a deal board, an inch thick, at a distance of 70 feet. In guns provided with patent breeches the cotton does not always ignite, owing to the difficulty of getting the cotton into the chamber; but in rifles and guns of the old-fashioned construction it succeeds perfectly, whether ignited by a percussion-cap, or by flint and steel. Owing to the rapidity of its combustion, it will probably be found that the barrels should be rather stronger than those in common use. I do not think that any danger need be apprehended from the friction of the ramrod during loading, for I have always remarked that when struck by a hammer, only that portion is exploded which is immmediately in contact with the metallic surface; as, however, there is not the slightest necessity for its being hard rammed, a wooden or bone end to the ramrod would answer every purpose. It is, I think, very questionable whether any cheaper material will form an efficient substitute for cotton. Dr. Leeson, Mr. Heisch, and myself, ascertained the fact, with regard to tow, in the laboratory of St. Thomas's Hospital, prior to my letter of the 17th. The tow acquired a feeble explosive power, but it left a large residue, and as a projectile agent appeared to be valueless. * * *

Gun cotton is certainly a much less formidable compound than most of the fulminating powders, and in many respects is even safer than gunpowder; still it must be remembered that its properties are at present but very imperfectly known. It is not improbable that large quantities, when dry, may undergo spontaneous combustion. I would therefore recommend that until wanted it be kept in small quantities, in a damp state, and even then in a place where, should it undergo decomposition, no danger could occur. * * * *.

In conclusion, I would observe, that the explosive cotton of Schoenbein, Otto, and myself, are an extension of the fact, long known to chemists, that various organic bodies, as paper, flax, cotton, &c., after being dipped into strong nitric acid, acquire the property of burning with the greatest rapidity when ignited; and that the fact of rapid combustion and explosion being identical in principle, and differing only in degree, must be borne in mind by those who are making experiments upon the process or its applicability to other materials than cotton—a substance which appears to me to have been selected with considerable judgment by Dr. Schoenbein.

I have the honour to remain, Sir,
Your obliged servant,
THOMAS TAYLOR.

As a criterion of the advantages, economically considered, of the gun cotton over gunpowder, we have thought it advisable to insert the letter of a correspondent to the *Mining Journal*. The writer has somewhat overstated the cost of the product, but still the approximation is near enough to shew the impracticability of superseding gunpowder, for mining operations, by the use of cotton, prepared according to the modes at present promulgated.

"The great sensation that has been caused by the extraordinary results which have emanated from the experiments in gun cotton, and the alleged probability of its superseding gunpowder in mining operations, has led me to make a few experiments and calculations, which are as follows:—The possibility of saturating cotton with nitric and sulphuric acid, in certain proportions, and to produce a most combustible compound, is indubitable, and I have succeeded in producing the anticipated results—but the practical economy must also be considered. The price of gunpowder, over the whole of England, ranges at 40s. per barrel, of 100 lbs., or 4¾d. per lb. The lowest price cotton, in the Liverpool price-currents, is Surat—the price of which is 6½d. per lb. Cost of manufacturing, I calculate,

Nitric acid, at	1s. per lb.
Sulphuric ditto	2d. „

Cotton takes up and holds, when saturated, after pressure, its own weight of water; therefore, 1 lb. of cotton will hold—

1·0000 nitric acid.
·6158 sulphuric acid.

1·6158 = 1s. 1¼d.
0 6½ cotton.
0 6¼—say, nearly 30 per cent. in labour, loss, and charges.

2 2 per lb. for gun cotton.

"The estimated effect is said to be twice that by weight of gunpowder—say, therefore, 1s. 1d. to do the work of powder. How can, therefore, gun cotton compete with powder, at 4¾d. per lb.? Again, ¼ lb. of powder occupies about 8 cubic inches in bulk; and 2 oz. of cotton, considerably compressed, 27 cubic inches. In my experiments I find, at a temperature of 130°, the gun cotton explodes spontaneously—this I discovered in the process of drying it. I offer these remarks to you, as the mining interest seems greatly interested; and, I fear, they will meet with great disappointment, if they calculate upon the results so bruited about."

On an improvement in the Daguerreotype process by the application of some new compounds of Bromine, Chlorine, and Iodine, with Lime. By R. J. Bingham, *Chemical Assistant in the Laboratory of the London Institution.*

All persons who have practised the Daguerreotype must have remarked, that in warm weather a considerable deposition of moisture takes place upon the glass or slate cover used to confine the vapour in the bromine or accelerating pan. This moisture must also necessarily condense upon the cold metallic surface of the plate during the time it is exposed to the bromine vapour. In fact, I have been informed by a number of professional Daguerreotypists (and I have experienced the difficulty myself), that they were unable to obtain perfect pictures during the excessive heat of the late season; and a very clever and enterprising operator, who last year made a tour on the continent, and brought home some of the finest proofs I have ever seen, entirely failed this season in obtaining clear and perfect pictures, from the constant appearance of a mist or cloud over the prepared surface. This appears to be caused by the deposition of moisture upon the plate, arising from the water in which the bromine is dissolved. To obviate this, some have recommended the pan to be kept at a low temperature in a freezing mixture; and M. Daguerre, in a communication to the French Academy of Sciences, recommends the plate to be heated; but in practice both these plans are found to be unsuccessful. (See Lerebour's *Traité de Photographie.*)

It appeared to me, that if we could avoid the use of water altogether in the accelerating mixture, not only would the difficulty I have mentioned be avoided, but a much more sensitive surface would be obtained on the plate. With this view, I endeavoured to combine bromine with lime, so as to form a compound analogous to bleaching powder. In this I was successful, and find that bromine, chloride of iodine, and iodine, may be united with lime, forming compounds having properties similar to the *so-called* chloride of lime.

The bromide of lime* may be produced by allowing bromine vapour to act upon hydrate of lime for some hours: the most convenient method of doing this is to place some of the hydrate at the bottom of a flask, and then put some bromine into a glass capsule, supported a little above the lime. As heat is developed during the combination, it is better to place the lower part of the flask in water at the temperature of about 50° F.: the lime gradually assumes a beautiful scarlet color, and acquires an appearance very similar to that of the red iodide of mercury. The chloro-iodide of lime may be formed in the same manner: it has a deep brown color. Both these compounds, when the vapour arising from them is not too intense, have an odour analogous to that of bleaching powder, and quite distinguishable from chlorine, bromine, or iodine, alone.

Those Daguerreotypists who use chlorine in combination with bromine, as in Wolcott's American mixture, or M. Guérin's Hungarian solution, which is a compound of bromine, chlorine, and iodine, may obtain similar substances in the solid state, which may be used with great advantage. By passing chlorine over bromine, and condensing the vapours into a liquid, and then allowing the vapour of this to act upon lime, a solid may be obtained having all the properties of the American accelerator; or by combining the chloro-iodide of lime with a little of the bromide, a mixture similar to that of M. Guérin's may be produced; but I really prefer, and would recommend the pure bromide of lime, it being, as I believe, the quickest accelerating substance at present known. By slightly coloring the plate with the chloro-iodide, and then exposing it for a proper time over the bromide, proofs may be obtained in a fraction of a second, even late in the afternoon. A yellow color should be given by the use of the first substance; and the proper time over the bromide is readily obtained by one or two trials. With about a drachm of the substance in a shallow pan, I give the plate ten seconds the whole of the first day of using the preparation, and add about three seconds for every succeeding one. The compound should be evenly strewed over the bottom of the pan, and will last with care for about a fortnight.

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* I call this substance bromide of lime, although there is a difficulty as to the composition of bleaching powder, and which would also apply to the compounds I describe. Some chemists regard the *chloride of lime* to be a compound of lime, water, and chlorine. Balard thinks it is a mixture of hypochlorite of lime and chloride of calcium; and the view of Millon and Prof. Graham is, that it is a peroxide of lime, in which 1 equivalent of oxygen is replaced by 1 of chlorine.

The great advantage of this compound is, that it may be used continuously for a fortnight without renewal; and, unlike bromine water, its action is unaffected by the ordinary changes of temperature.—[*Phil. Journal.*]

REPORT OF AMERICAN PATENTS.

From the "Journal of the Franklin Institute."

BY MR. C. M. KELLER.

To ISAAC T. GRANT, *of Schaghticoke, Rensellaer county, New York, for an improvement in the fan mill for cleaning grain.*

THE patentee says:—"My improvement consists in adding to the screens and other parts in general use in fan mills, an additional screen, and what I denominate a chess-board, which are arranged in such manner as to cause a much stronger blast of wind to act upon the grain at the lower part of the shaking sieves or screens than at the upper, and thereby to aid the action of said sieves in affecting the screening; by which means the two operations are performed simultaneously, and that in less than half the time required for cleaning the grain in the old way, and performing the work more effectually."

Claim:—"What I claim, and desire to secure by letters patent, is the manner in which I have arranged the screen and the chess-board, and combined them with the screens ordinarily used, so as to obtain two distinct currents of wind, and to subject the falling grain to the stronger current below the screen and chess-board, thereby blowing off the heavier portions of foreign matter, whilst the chaff is blown off by the ordinary currents in the upper compartments of the shoe."

To DANIEL S. STAFFORD, *of Rochester, Sangamore county, Illinois, for an improvement in the ditching machine and road plough.*

CLAIM :—"What I claim therein as new, and desire to secure by letters patent, is, first, the manner in which I have combined the wheel and the lever, or tiller, with the beam of the plough, for the double purpose of guiding and of raising or lowering the fore-end of the mould-board, as set forth.

"I claim the manner of combining and arranging the wheel with the plough, by means of its cranked shaft and treadle, thereby enabling the attendant, who rides upon the seat, to raise the rear end of the mould-board, and to depress the point, as described.

"I also claim the combining of the horizontal wheel, and the plank, or piece which it sustains, with the plough, thereby enabling the instrument to form a trench of increased width, when required."

The wheel axle turns up at right-angles and passes through the beam, and is attached to a lever, the fulcrum of which is a crank arm, so that by means of the lever the wheel can be raised or lowered, and its direction changed at pleasure.

To SAMUEL SHEARER, *of Big Prairie, Wayne county, Ohio, for an improvement in the plough.*

To the lower edge of the mould-board, and just at back of the share, there is a shoe attached by a bolt, to admit of adjustment as the shoe wears away; this prevents the mould-board from wearing away at this point.

Claim :—"I wish it to be understood that I do not claim the mere addition of a separate casting or shoe to prevent wear; but, having thus fully described my improvements, what I claim therein as my invention, and desire to secure by letters patent, is the combination of the shoe with the mould-board of the above described plough, in the manner and for the purpose described, so that the plough shall always run in the proper position."

To ROBERT COMINGS, *of Leina, La Grange county, Indiana, for an improvement in the ditching machine.*

To a frame is adapted two adjustable side cutters for forming the sides of the ditch, and another for the bottom of the ditch, which corresponds with the share of a plough, and from this latter extends an inclined and twisted bottom or mould-board, connected at the side with another mould-board, and these two with wings, by which arrangement the earth is cut, carried up and discharged at the side of the ditch.

Claim:—"What I claim as my invention and improvement, and desire to secure by letters patent, is the combination and arrangement of the mould-boards, formed in the manner and for the purpose described, with the twisted bottom, and wing, and base, and adjustable cutters, as herein before described. I make no claim to the other parts of the machine, as they are common to all ditching machines."

To COLEMAN C. ESTES, *of the county of Maury, Tennessee, for an improvement in the rotating hemp break.*

THE beater is a cylinder with longitudinal ribs on its surface, which act on the hemp as it is presented to its action, over a moveable and adjustable rest, and as it passes down, over an adjustable concave, from which extends a spout for the discharge of the woody matter, &c.; and a board is placed above to act as a screen, to protect the attendant from dust, &c.

Claim:—"What I claim as my invention, and desire to secure by letters patent, is the combination of the revolving beating cylinder, moveable and adjustable rest, and hinged concave, all arranged and operating with the flue and screen, substantially in the manner and for the purpose described and set forth."

To EDMUND and JOHN T. WARREN, *of New York, for improvements in the machine for thrashing grain, &c.*

THE frame which contains the beater, cylinder, and concave, is hinged to the main frame by joint pins, just below the pulley, on the cylinder, and is held in any desired position, to regulate the inclination of the delivery spout by pins on the end of springs at the side. The pulley is connected with the shaft of the cylinder by means of a spring, in the manner of connecting the spring in a clock, the object being to avoid breaking the machine when subject to a sudden stoppage—and the beaters, which are parallel with the shaft, are attached to springs projecting from the surface of the cylinder.

Claim:—"What we claim as our invention, and desire to secure by letters patent, is the combination of the spring pulley with the cylinder of the threshing machine, as above described.

"We also claim the spring beaters, as above described.

"Thirdly, the changeable or moveable frame, as described."

To E. JOHNSON and D. B. COX, *of Troy, Rensselaer county, New York, for an improvement in the cooking stove.*

THE patentees say:—"The nature of our invention consists in the manner of distributing the heat over the surface of the oven in the most advantageous manner, and in the combination of the two fire-places and flues to obtain the most effect from both. It is found in ordinary stoves that the ovens bake unequal, those parts nearest the doors being less heated than the centre, and in stoves where two fires are used, the draught has been unequally, or the heat from one or other of the fires has been lost to the oven; by our arrangement both of these evils are avoided."

Claim:—"Having thus fully described our improvements, what we claim therein as new, and which we desire to secure by letters patent, is the combination of the fire-places with the flue, constructed, arranged, and combined in the manner and for the purpose set forth; the pipe which connects the fire *a*, with the fire *b*, being made to divide the descending flue.

"And we also claim forming the flue under the stove, in the manner described, so that the draught shall be principally thrown to the sides, without being entirely cut off in the centre.

To WARREN HALE and ALLEN GOODMAN, *of Dana, Worcester county, Massachusetts, for an improvement in the machine for cutting or planing irregular surfaces of wood.*

CLAIM:—"What we claim as our invention, and desire to secure by letters patent, is the method herein above described, of copying or forming the longitudinal irregularities of piano legs, and other similar articles, on rough blocks of wood, by means of a carriage *horizontally* against the *revolving* cutter, and holding both the pattern and the rough, the cutting tool being raised and depressed, for depths of cut, by rollers resting on the patterns.

To AGUSTUS HARNARM, *of Washington, for a mode of curing smoky chimnies.*

A SQUARE box is placed at the top of the chimney, with an aperture on each side, for the admission of air. This chamber is divided into four compartments, by diagonal division plates, designated in the claim by the letter D, and in each of these compartments there is an inclined plate, indicated by the letter H, which leaves an aperture for the passage of the gases, smoke, &c., at the inner angle of the chamber; and at the top there are four corresponding inclined plates, forming a pyramidal top, leaving four apertures in the middle formed by a square hole in the cap, and the junction of the diagonal plates inside.

Claim:—What I claim as my invention, and desire to secure by letters patent, is the manner of combining the plates with each other, and with the box, the whole being constructed, arranged, and operating, as above described, and substantially for the purpose set forth."

To GEORGE W. CHERRY, *Alexandria,* D. C., *for an improvement in the ventilating hat.*

Claim :—"I claim the cutting holes through the body and lining of the hat, and leaving the outside plush whole, or merely piercing it without cutting away any portion, so that the nap shall cover said holes, and render them invisible on the outside, while a free circulation is maintained through the hat, as described.

"I also claim, in combination with a hole or holes in or near the top of the hat, a hole or holes at some distance down the side of the hat, just above the top of the head, to cause a circulation through the hat, as set forth.

"I also claim the combination of the ornamental cup with the hat, as described, which allows ventilation unobstructed, and prevents the rain from entering."

To WILLIAM BULLOCK, *of Jersey city, Hudson county,* N. J., *for improvements in the plough.*

THIS improvement is for the addition of one or more points between the main point and the back end of the share, and projecting beyond its cutting edge, and also making these points to fit on to dove-tail projections on the share.

Claim :—"What I claim as my invention, and desire to secure by letters patent, is the loose points upon the upper side of the share, being connected to the share by means of a dove-tail, or other analogous device. I also claim the invention of a plough having one or more points between the forward point and the back end of the cutting part of the share, whether cast fast to the share or loose, as per drawings annexed, substantially in the manner and for the purpose set forth."

To ABNER CHAPMAN, *of Pope's Corners, Saratoga county, New York, for an improvement in the re-action water-wheel.*

"I CLAIM the delivering of the water from a penstock or trunk, into the issues or buckets of a re-action wheel that revolves vertically at the lower part only of said wheel, by forming the opening from such penstock or trunk so that it shall enter such wheel at its lower part only, in the manner and for the purpose set forth; by which construction and arrangement I am enabled to give any desired diameter to such re-action wheels."

To ABRAHAM DECKER, *of Walnut Township, Fairfield county, Ohio, for improvements in the bee-hive.*

THE patentee says :—"The nature of my invention, and that which distinguishes it from all other hives before known, consists in the arrangement of the passages through which the bees have to pass to enter the hive, with the view to prevent the entrance of the miller, moth-worm, and other insects, into the hive, and in providing, in combination with this arrangement of the passages, compartments containing honey-comb, to detain the miller, or moth on their way to the hive, should they succeed in entering some of the passages."

Claim:—"Having thus pointed out the characteristics or principles of my invention, and the manner of making and using the same, what I claim as my invention, and desire to secure by letters patent, is the arrangement of the various passages leading to the hive, and in combination therewith, the chambers with honey-combs, surrounding the passages, for the purpose, as fully expressed above, of preventing the entrance and detaining the miller, moth-worm, and other insects, as herein fully described; and I also claim, in combination with the passages and the chamber the additional moth or insect trap, situated relatively to the entrance passages, as herein described."

To HENRY HIZER, *of Wooster, Wayne county, Ohio, for improvements in the machine for cleaning clover seed.*

THE clover seed is discharged from a thrasher on to a screen made of strips of metal bent in the form of segments of cylinders, and placed across in two rows, one above the other, and those of the upper row placed above the spaces between those of the under row. From this screen the seeds pass to the hulling cylinder and concave, the rubbing surfaces of which are made of hoops of metal, secured by means of staples.

Claim:—"What I claim as my invention, and desire to secure by letters patent, is the screen composed of strips of metal, of a curved form, constructed and arranged as above specified.

"I also claim constructing the cylinder and concave, with wrought-iron hoops, as described, projecting from the surface, and fastened with staples that form teeth thereon, in the manner and for the purpose above made known."

To SAMUEL B. HOWD, *of Arcadia, Wayne county, New York, for an improvement in the wheel for propelling vessels.*

THE patentee says:—"The nature of my invention consists in constructing a submerged wheel for propelling boats, so as to give the paddles a compound movement, by which they enter into and recede from the water with diminished friction, and become inert during that part of the revolution of the wheel when they are out of the field of effective action."

Claim:—"What I claim as my invention, and desire to secure by letters patent, is a mode of constructing a submerged wheel for propelling boats with paddles, having a compound motion, such as to cause them to enter into and recede from the field of effective action, to move edgewise inertly from the point of recession to that of dipping, in the form and manner and for the purpose set forth in the foregoing specification."

To SIMON W. DRAPER, *of Boston, Massachusetts, for an improvement in the piano-forte.*

THE patentee says:—"The object of my improvement is to increase the volume of tone, and to augment the harmony, when a chord is struck upon the instrument, by producing with the stroke of each hammer the usual simple tone, and in addition thereto a consonant tone an octave below.

"This object is effected by means of an additional string for each note in the instrument, which is made sufficiently longer than those by which the tone is commonly produced, to produce the octave tone above specified: a *secondary* 'crooked bridge,' in rear of the ordinary one, being provided for the said additional strings, and some necessary alterations in the construction of the 'iron frame' and 'back bridge' being made.

Claim:—"Having thus described my improvement, and its application to a piano-forte, I shall state my claim as follows:—What I claim as my invention, and desire to secure by letters patent, is combining an additional octave string to each note of the piano-forte, in the manner described: that is to say, by causing said strings to be raised at the head or right-hand end, a little above the strings that form the note, while at the opposite end they are depressed sufficiently to bring all the strings to a level at the point where the hammer strikes them.

"I also claim placing the secondary bridge, or that nearest the right-hand end of the instrument, in an opening made for that purpose in the plate, through which the bridge projects, a little higher than the one immediately in front of it; the hitch pins of the common strings being in that part of the plate that is between the two bridges, and those for the octave strings being beyond the secondary bridge.

"I also claim the combination of the brace with the plate for the purpose of supporting that part of said plate between the bridges,—it being attached thereto by screws, or otherwise, as herein fully set forth.

"Lastly, I claim, in combination with the elevated strings, the crooked damper, in the manner and for the purpose described."

To SYLVANUS B. STILWELL, *of Brooklyn, King's county, New York, for improvements in the system of cutting garments.*

THE patentee says:—"Heretofore it has been essayed to construct patterns for cutting garments, but to effect it the pattern had to be varied to every size; for this purpose series of holes have been made in pasteboard, with the number corresponding to the size stamped beside them; in this way a variety of patterns are in fact formed on one, but the nature of my invention consists in forming a pattern of medium size, and on right lines on said pattern to form a scale which, together with a diagonal one, will serve to cut a coat or other garment of any desired size or shape, always insuring the same style of dress in each case without a multiplicity of patterns."

Claim :—"Having thus fully described my improvements, and pointed out their uses, what I claim as my invention, and desire to secure by letters patent, is the combination of a pattern in any style for cutting garments, with scales for regulating the sizes thereof, substantially in the manner herein set forth."

To Thomas H. King, *of New York City,* N. Y., *for an improvement in the refrigerator.*

This refrigerator consists of two compartments, one for containing provisions, &c., and the other ice, and a coil of tubes which communicates with the atmosphere outside, and with the provision chamber, which is also provided with an air pump. After the provisions have been put into the safe and closed, the communication with the coil of pipes is closed and the air pumped out, and then the communication with the coil opened to admit cold air.

Claim :—"What I claim as my invention or improvement, and desire to secure by letters patent is the above-described method of preserving food in hot places, seasons, or climates, in a *fresh, dry, cold air,* without the *immediate* presence of ice, or other cause, to produce humidity; and this I claim to do either by creating a partial or almost entire vacuum, or by blowing or pumping in the air in the manner aforesaid; thus fully and effectually causing *ventilation,* by air, at a low temperature, and thereby better preserving from decay animal, vegetable, and other substances, liable to be destroyed by the presence of heat and moisture. I also claim the right to construct, use, and vend the same, and to apply the coil of pipe, tubing, or cylinder; as also the air pump, force pump, or bellows, to vessels or any apparatus already made and used as refrigerators for the preservation of food, &c., in the manner aforesaid."

To Jessey Fitzgerald, *of New York City, for an improvement in the mill for grinding,*

This is a conical mill, the shell or concave of which is composed of segments, with adjustable strips of sheet metal between, that constitute the teeth. The supply of grain is regulated by an adjustable disc, which governs the aperture leading to the stone.

Claim :—"What I claim as my invention, and desire to secure by letters patent is,—1st: making the external cone in segments, having adjustable metallic teeth or grinders between them, the said teeth being adjusted by the means above described, or any other substantially the same. 2nd: the regulating the admission of the grain to the mill by means of the revolving guage, as described."

To ANSON P. NORTON *and* MORRIS OWEN, *of Sangerfield, Oneida county, New York, for an improvement in the bark mill.*

ON the shaft of the double nut, as heretofore used, there are three arms with teeth, and these rotate between two sets of bars also provided with teeth, attached to the shell or case of the mill, for the purpose of breaking the bark before it is presented to the action of the grinders.

Claim:—"Having thus fully described our machine, and its improvements, what we claim as our invention, and desire to secure by by letters patent, is the combination of the bars and the toothed arms on the double nut shaft running between the straight toothed bars with the bark mill, constructed and arranged in the manner and for the purpose described."

LIST OF REGISTRATIONS EFFECTED UNDER THE ACT FOR PROTECTING NEW AND ORIGINAL DESIGNS FOR ARTICLES OF UTILITY.

1846.

Sept. 29. *Edwin Sherwood*, of Birmingham, for a fastening for a button case.

30. *Henry Austin*, of 10, Walbrook, City of London, for a water-closet pan.

Oct. 5. *James Russell*, of 20, Grove End Road, St. John's Wood, London, for a letter file-clip.

7. *Charles William Kerby*, of Goswell-road, for a collapsible shower-bath.

7. *Henry Briant*, of 1, Palsgrave-place, Strand, and 201, Strand, London, pyrotechnical chemist, for the universal safety signal light.

8. *George Andrews*, of No. 58, Duke-street, Liverpool, for a drilling-machine.

8. *George Grainger*, of Worcester, for a shutter-knob, with rose and screw combined.

10. *Windle & Blyth*, of Walsall, for the Anglesea spur.

12. *Samuel Messenger*, of Birmingham, for an improved roof-lamp for railway and other carriages.

13. *Charles Lewis*, of 32, Stangate-street, Lambeth, bath manufacturer, for the Indian shower-bath.

15. *Robert Marples*, of Sheffield, for a brace-pad.

Oct. 15. *John Mc Mahon,* of Fenchurch-street, tool manufacturer, for a double ratchet brace.

16. *M. Salt & Son,* of 21, Bull-street, Birmingham, surgical instrument maker and cutler to Her Majesty, for a spontaneous enema syringe.

16. *William George Henry Taunton,* of Albert-buildings, Salt House Dock, Liverpool, for a fastening for connecting trousers to boots.

17. *Thomas De la Rue & Co.,* of Bunhill-row, for a chess-board.

19. *Josiah Allen, the younger,* of Birmingham, printer and stationer, for an improved shape for letter and note paper.

22. *John G. Mc Gee & Co.,* of 46 and 48, High-street, Belfast, for a coat.

22. *Edward Day & Joseph Robinson,* of 8, Victoria-crescent, Haverstock-hill, Middlesex, for a coal-scuttle.

23. *Philp & Whicker,* of 67, St. James's-street, for an embroidery needle.

24. *Charles Stocken,* of Regent-street, for an envelope for newspapers.

24. *Edward Loomes,* of Whittlesea, near Peterborough, farmer, for a portable food-steamer for cattle.

24. *William & John Sangster,* of London, parasol and umbrella makers, for the Indian parasol.

26. *Stock & Sharp,* of Cannon-street, Birmingham, lead merchants, plumbers, &c., for the fountain beer-engine.

26. *Frederick Marriott,* of 335, Strand, for the publicity omnibus.

26. *Edward Collins,* of Birmingham, for a lock-spindle.

List of Patents

That have passed the Great Seal of IRELAND, from the 21st September to 21st October, inclusive.

To William Pidding, of Wigmore-street, in the county of Middlesex, Gent., for an improved process for preserving the flavor of coffee and cocoa, or of any preparations thereof, from the effects of the atmosphere.—Sealed 24th September.

François Stanilas Meldon de Sussex, of Millwall, in the county of Middlesex, manufacturing chemist, for improvements in the manufacture of soda and potash.—Sealed 7th October.

Bennett Woodcroft, of Manchester, in the county of Lancaster, consulting engineer, for an improved mode of printing certain colors on calico and other fabrics.—Sealed 7th October.

Josue Heilmann, of Mulhausen, in the Department du Haut Rhine, in the kingdom of France, machine maker, for improvements in certain machines used for preparing to be spun cotton, wool, and other fibrous materials.—Sealed 7th October.

Hugh Greaves, of Hulme, in the parish of Manchester, in the county of Lancaster, engineer, for improvements in the construction of railways, and in the vehicles to be used thereon.—Sealed 10th October.

John Augustin Alexis Sauvage, of Rue Richer, Paris, in the kingdom of France, mechanist, for improvements in condensing the steam of steam-engines, and in supplying water to steam-engine boilers.—Sealed 10th October.

Augustus William Hillary, of No. 66, Cadogan-place, Chelsea, but at present residing at No. 146, Avenue des Champs Elysees, in the city of Paris, Esq., for improvements in the manufacture of gas.—Sealed 10th October.

List of Patents

Granted for SCOTLAND, subsequent to September 22nd, 1846.

To Benjamin Fothergill, of Manchester, machine-maker, for improvements in certain parts of machinery used in the preparation for spinning, and in spinning and doubling of cotton, wool, and other fibrous substances.—Sealed 24th September.

Joseph Gray, of Redcross-street, Southwark, London, machinist, for improvements in gas meters.—Sealed 24th September.

Robert Heath, of Heathfield, in the county of Lancaster, for certain improvements in the construction of wheels, axles, and bearings, to be used upon rail and other roads; which improvements are also applicable to mill gearing and other purposes. —Sealed 28th September

John Warburton, of Kearsley, in the county of Lancaster, tinsmith, for certain improvements in machinery or apparatus for preparing, slubbing, and roving cotton, wool, and other fibrous materials.—Sealed 28th September.

Antonio James Mayer, of Ashley Crescent, London, for improvements in certain wood and cutting machines.—Sealed 29th September.

Samuel Millbourn, of St. Mary's Cray, Kent, paper-maker, for improvements in the manufacture of paper.—Sealed 29th September.

Peter Fairbairn, of Leeds, machine-maker, and Peter Carmichael, manager for Messrs. Baxter Brothers and Co., flax spinners, Dundee, for improvements in machinery for drawing, roving, and spinning flax, hemp, wool, silk, and other fibrous substances.—Sealed 1st October.

John Bullock Lloyd, of Conduit-street, Hanover-square, London, chemist, for improvements in the manufacture of quinine.—Sealed 2nd October.

Pierre Armand le Comte de Fontainemoreau, of New Broad-street, London, for certain improvements in producing artificial fuel; being a foreign communication.—Sealed 6th October.

John Taylor, of the Adelphi, London, for certain improvements in the manufacture of explosive compounds,—being a foreign communication.—Sealed 12th September.

Robert Warrington, of Apothecaries' Hall, London, chemist, for improvements in preserving animal and vegetable substances.—Sealed 12th October.

William Rodger, of Shawfield-street, King's-road, Chelsea, Lieutenant, R. N., for improvements in anchors.—Sealed 12th October.

John Paterson Reid, of Glasgow, and Thomas Johnson, of the same place, mechanic, for certain improvements in machinery for weaving, and for producing patterns in weaving; as also in machinery for finishing certain woven fabrics.—Sealed 13th October.

John Condie, of Glasgow, engineer, for improvements in machinery used in manufacturing malleable iron.—Sealed 14th October.

George Winslow, of Burton-crescent, London, for improvements in machinery for manufacturing files and rasps,—being a foreign communication. Sealed 19th October.

New Patents
SEALED IN ENGLAND.
1846.

To Albert Robert Cunningham, of Sydenham, Kent, Gent., and Joseph Threlfall Carter, of the same place, engineer, for certain improvements in propelling carriages on railways. Sealed 1st October—6 months for inrolment.

Charles Marie Fouillet, of Paris, engineer, for improvements in railways. Sealed 2nd October—6 months for inrolment.

William Weild, of Manchester, mechanical draughtsman, for improvements in certain mills for grinding, and in the manufacture of certain parts of mills. Sealed 2nd October—6 months for inrolment.

Edmund Morewood, of Steel-yard, Upper Thames-street, City, merchant, for certain improvements in machinery for separating certain fibrous substances from seed and other extraneous matters,—being a communication. Sealed 2nd October—6 months for inrolment.

William Wild, of Salford, in the county of Lancaster, moulder, for certain improvements in machinery or apparatus for manufacturing barrels and other vessels of capacity. Sealed 2nd October—6 months for inrolment.

Pierre Bryere, of Rue Boileau, Nantes, France, boot maker, for improvements in the manufacture of boots, shoes, and clogs. Sealed 2nd October—6 months for inrolment.

Peter Fairbain, of Leeds, machine maker, and Peter Carmichael, manager for Messrs. Baxter Brothers and Co., Dundee, North Britain, flax spinners, for improvements in machinery for drawing, roving, and spinning flax, hemp, silk, and other fibrous substances. Sealed 2nd October—6 months for inrolment.

Samuel Holdsworth, of Norwood, in the county of Surrey, Gent., for certain improvements in apparatus to be applied to railway carriages, to prevent accidents thereon. Sealed 6th October—6 months for inrolment.

William Farthing, of the town and borough of Kingston-upon-Hull, merchant, for certain improvements in the manufacture of glass,—being a communication. Sealed 8th October—6 months for inrolment.

Samuel Heseltine, jun., of Bromley, engineer, for certain improvements in the construction of lamps to burn oil,—being a communication. Sealed 8th October—6 months for inrolment.

Robert Wilson, of Woodhouses, Lancaster, weaver, for certain improvements in looms for weaving velvets and other piled goods, and in the machinery or apparatus for cutting the pile or nap of the same. Sealed 8th October—6 months for inrolment.

John Warburton, of Kearsley, Lancaster, tin-smith, for certain improvements in machinery or apparatus for preparing, slubbing, and roving cotton, wool, and other fibrous materials. Sealed 8th October—6 months for inrolment.

William Fairbairn, of Manchester, civil engineer, for improvements in the construction of iron beams, for the erection of bridges and other structures. Sealed 8th October—6 months for inrolment.

Francis Nalder, of Cheapside, City, for improvements in the manufacture of gloves. Sealed 8th October—6 months for inrolment.

Marcel Jean Milon, of 27, Rue Fronchet, Paris, Gent., for improvements in making roads and ways. Sealed 8th October, —6 months for inrolment.

John Rombley, of Sunderland, engineer, for improvements in capstans and windlasses. Sealed 8th October—6 months for inrolment.

George Lowe, of Finsbury-circus, civil engineer, for improvements in the manufacture of and in burning gas, and in the manufacture of fuel. Sealed 8th October,—6 months for inrolment.

Price Struvé, of Swansea, engineer, for improvements in railway transit, and in moving or raising weights. Sealed 8th October—6 months for inrolment.

John Taylor, of the Adelphi, Gent., for improvements in the manufacture of explosive compounds,—being a communication. Sealed 8th October—6 months for inrolment.

James Farnsworth, of Sheffield, engineer, for certain improved machinery or apparatus for the manufacture of bricks and tiles, —being a communication. Sealed 8th October—6 months for inrolment.

Michael Louis Ferant, of 361, Oxford-street, Gent., for improvements in treating oils,—being a communication. Sealed 8th October—6 months for inrolment.

George Frederick Muntz, Esq., M.P., of Ley Hall, near Birmingham, for an improved manufacture of metal plates for sheathing the bottoms of ships or other vessels. Sealed 15th October —6 months for inrolment.

John Condie, of Glasgow, engineer, for improvements in machinery used in manufacturing malleable iron. Sealed 15th October—6 months for inrolment.

John Hornby Maw, of Hastings, Esq., for improvements in the manufacture of pens. Sealed 15th October—6 months for inrolment.

François Durand, and Onesiphore Pecqueur, of Paris, engineers, for improvements in forming leather into tubes, cylinders, switches, cases, sheaths, hats, and other articles. Sealed 15th October—6 months for inrolment.

William Palmer, of Sutton-street, Clerkenwell, manufacturer, for improvements in the packing of, and in the gaining, and in the manufacture of products from fat or fatty matters. Sealed 15th October—6 months for inrolment.

James Kite, of New North-road Bridge, Hoxton, Gent., for certain improvements in steam-engine chimnies, in furnaces and flues, in vent and exhaust pipes, and in other like smoke and air conductors, and in the machinery or apparatus connected therewith. Sealed 15th October—6 months for inrolment.

Arthur Millward, of Birmingham, in the county of Warwick, Gent., for certain improvements in producing figured surfaces sunken and in relief. Sealed 15th October—6 months for inrolment.

John Donkin, of Grange-road, Bermondsey, civil engineer, for improvements in the manufacture of paper or in the machinery employed therein, and in the process of bleaching paper, linen, and other manufactures in which chloride of lime is employed,—being a communication. Sealed 15th October— 6 months for inrolment.

Ebeneza Southworth, of Chorlton-upon-Medlock, near Manchester, draper, for certain improvements in engines to be worked by steam or other power, and applicable to raising or forcing water to the propulsion of vessels and other similar purposes. Sealed 15th October—6 months for inrolment.

George Winslow, of Burton-crescent, merchant, for improvements in machinery for manufacturing files and rasps. Sealed 15th October—6 months for inrolment.

John Ryan, of the Royal Polytechnic Institution, Doctor of Medicine and Professor of Chemistry, for certain improvements in the preservation of organic and other substances. Sealed 17th October—6 months for inrolment.

Etienne Abram Maccaud, of No. 1, Place de la Madeleine, in the city of Paris, mechanician, for improvements in lamp and gas burners. Sealed 22nd October—6 months for inrolment.

John James Alexander Maccarthy, of Sidney-terrace, Brompton, Gent., for certain improvements in anchors and fids for masts of vessels. Sealed 22nd October—6 months for inrolment.

William Anderson, of Clitheroe, Lancaster, cotton spinner, for certain improvements in machinery or apparatus for preparing and spinning cotton and other fibrous substances. Sealed 22nd October—6 months for inrolment.

John Paterson Reid, of Glasgow, Gent., and Thomas Johnson, of the same city, mechanic, for certain improvements in machinery for weaving and for producing patterns in weaving; as also in machinery for finishing certain woven fabrics. Sealed 22nd October—6 months for inrolment.

James Thomas Jullien, of Stratford, Essex, analytical chemist, for improvements in the manufacture of certain acids; also improvements in decomposing certain acids and applying the products resulting therefrom to the production of certain chemical compounds. Sealed 22nd October—6 months for inrolment.

James Lysander Hale, of Hackney, civil engineer, for certain improvements in sewerage and drainage, and apparatus connected therewith, parts of which are applicable to steam-engines. Sealed 22nd October—6 months for inrolment.

John Hutton, of Commercial-road, East, chronometer maker, for certain improvements in chronometers and other time keepers. Sealed 22nd October—6 months for inrolment.

Henry Mapple, of Child's-hill, Hendon, machinist, for improvements in apparatus for transmitting electricity between distant places, and in electric telegraphs. Sealed 27th October—6 months for inrolment.

CELESTIAL PHENOMENA for November, 1846.

D.	H.	M.	
1			Clock after the ☉ 16m. 15s.
			☽ rises 3h. 40m. A.
			☽ passes mer. 10h. 30m. A.
			☽ sets 4h. 14m. M.
2	7	57	♃'s first sat. will im.
3	9	11	Ecliptic oppo. or ○ full moon.
4			Occul. A.S.C. 454, im. 7h. 44m. em. 8h. 41m.
—			Occul. δ3 Tauri, im. 17h. 3m. em. 18h. 4m.
	9	6	♃'s second sat. will im.
5			Clock after the sun, 16m. 15s.
—			☽ rises 6h. 13m. A.
—			☽ passes mer. 1h. 13m. M.
—			☽ sets 9h. 7m. M.
	9	12	♃ in conj. with the ☽ diff. of dec. 3. 4. N.
7	15	23	♃'s first sat. will im.
9			Occul. *A*2 Cancri, im. 15h. 11m. em. 16h. 31m.
9	13	33	☿ in conj. with Juno diff. of dec. 12. 24. S.
10			Clock after the sun, 15m. 56s.
—			☽ rises 11h. 3m. A.
—			☽ passes mer. 5h. 25m. M.
—			☽ sets 0h. 38m. A.
	11	44	☽ in □ or last quarter
11	11	42	♃'s second sat. will im.
11	14		☽ in Apogee
14	17	17	♃'s first sat. will im.
15			Clock after the sun, 15m. 15s.
—			☽ rises 3h. 17m. M.
—			☽ passes mer. 9h. 1m. M.
—			☽ sets 2h. 38m. A.
16	11	45	♃'s first sat. will im.
16	13	10	♂ in conj. with the ☽ diff. of dec. 0. 19. N.
	15	20	♄ in □ with the ☉
17			Mercury R. A. 16h. 57m. dec. 25. 14. S.
—			Venus R. A. 15h. 2m. dec. 16. 19. S.
—			Mars R. A. 13h. 59m. dec. 11. 29. S.
—			Juno R. A. 16h. 24m. dec. 11. 34. S.
			Pallas R. A. 0h. 11m. dec. 18. 17. S.
—			Ceres R. A. 3h. 49m. dec. 13. 11. N.
17			Vesta R. A. 11h. 49m. dec 6. 22. N.
—			Jupiter R. A. 4h. 49m. dec. 21. 41. N.
—			Saturn R. A. 21h. 49m. dec. 14. 49. S.
—			Georg. R. A. 0h. 40m. dec. 3. 37. N.
—			Mercury passes mer. 1h. 12m.
—			Venus passes mer. 23h. 18m.
—			Mars passes mer. 22h. 18m.
—			Jupiter passes mer. 13h. 2m.
—			Saturn passes mer. 6h. 3m.
—			Georg. passes mer. 8. 54.
	4	51	☿ greatest hel. lat. S.
	21	7	♀ in conj. with the ☽ diff. of dec. 1. 3. S.
18	6	14	♃'s first sat will im.
18	11		Ecliptic conj. or ● new moon
18	14	19	♃'s second sat. will im.
19	16	21	Ceres in oppo. to the ☉, intens. of light 1·011
20			Clock after the sun 14m. 12s.
—			☽ rises 8h. 46m. M.
—			☽ passes mer. 1h. 12m. A.
—			☽ sets 5h. 37m. A.
	3	33	☿ in conj. with the ☽ diff. of dec. 6. 38. S.
21			Pallas stationary
22			Occul. *p*1 Sagittarii, im. 4h. 28m. em. 5h. 40m.
22	15	5	☿ greatest elong. 21. 47. E.
23			Occul *B*2 Capricorni, im. 5h. 47m. em. 6h. 29m.
23	13	39	♃'s first sat. will im.
24	23	40	♄ in conj. with the ☽ diff. of dec. 6. 26. S.
25			Clock after the ☉ 12m. 50s.
—			☽ rises 0h. 20m. A.
—			☽ passes mer. 5h. 47m. A.
—			☽ sets 11h. 25m. A.
	8	8	♃'s first sat. will im.
	10	31	☽ in □ or first quarter
	10		☽ in Perigee
	16	25	♃'s second sat. will im.
28	3	25	♅ in conj. with the ☽ diff. of dec. 2. 20. S.
28	5	25	♃'s second sat. will im.
29	6	13	♃'s second sat. will im.
30	15	34	♃'s first sat will im.

J. LEWTHWAITE, Rotherhithe.

THE

LONDON JOURNAL,

AND

REPERTORY

OF

Arts, Sciences, and Manufactures.

CONJOINED SERIES.

No. CLXXX.

RECENT PATENTS.

To John Dewrance, *of Liverpool, in the County of Lancaster, engineer, for his invention of certain improvements in steam boilers, and in the construction, composition, and manufacture of bearings, steps, and other rubbing surfaces of steam engines and other machinery, and also for a method of lubricating the same.*—[Sealed 7th April, 1845.]

The first part of this invention, viz., improvements in steam boilers, consists in the application to locomotive engine and other boilers of a box, chamber, or chambers, in addition to the ordinary fire-box, whereby the combustible gaseous products of the furnace, in passing to the boiler flues, are caused to mix with atmospheric air, and become consumed.

By referring to Plate XIV., this part of the invention will be clearly understood. Fig. 1, is a longitudinal vertical section of the improved boiler; and fig. 2, is a transverse section of the same, taken vertically through about the middle of the air chamber. *a,* is the fire-box of a locomotive engine boiler; *b,* an air chamber, surrounded by the water in the boiler, in the same manner as it surrounds the fire-box; *c, c, c,* are short flue tubes, connecting the fire-box with the chamber *b*; or, in place of these tubes, the fire-box and chamber may be connected by one or any number of flues. *d, d, d,* are the ordinary flue tubes; *e,* is the bottom plate of the air-chamber *b,* fitting air-tight into its place; and *f, f, f,* are valves, by which atmospheric air is admitted, through a pipe or pipes, into the chamber *b,* for the purpose of mixing with the gases and smoke evolved from the combustion of the fuel in the furnace. These valves are to be regulated by the engineer, as occasion may require, so as to admit the quantity of air into the chamber which shall be found requisite for completing the combustion of the gaseous products of the fuel. The air being thus admitted into the chamber *b,* becomes mixed with the combustible gases arising from the fire in the furnace, and materially assists in their combustion. By this means a larger quantity of heat is evolved, and communicated to the boiler for the generating of steam, and thus an economy of fuel is effected.

The patentee claims the use and application of an additional chamber or chambers, (such as the aforesaid chamber *b*,) in locomotive and other boilers, for the purpose of more perfectly consuming the combustible matters evolved from the furnace; but he does not confine himself to the peculiar form of chamber shewn in the drawing, nor to the precise arrangement or form of the several parts which have been described; this part of the invention being the addition of an air-chamber to locomotive and other boilers, for the purposes above described.

That part of the invention which refers to improvements in the construction, composition, and manufacture of bearings, steps, and other rubbing surfaces of steam-engines and other machinery, consists, firstly,—of the several alloys of metals to be used in forming such bearings, steps, and other rubbing surfaces, hereinafter described; secondly,—of an improved mould or shape, for casting or forming such bearings, steps, and other rubbing surfaces; and, thirdly,—in the introduction of a skeleton framing, key, or piece of hard metal, into the substance of a bearing, step, or other piece of machinery having a rubbing surface, and made of soft metal, or metallic alloy, as hereinafter described. And, Firstly, the improved alloys of metals for forming such bearings, steps, and rubbing surfaces, are intended as substitutes for brass, gun-metal, or tin, as usually employed for the several purposes of axle-box bearings, steps, or other rubbing surfaces of machinery.

The advantages proposed to be obtained by the use of steps, bearings, &c., formed of the new alloys, are—that, as compared with similar steps constituted of the harder alloys, such as brass or gun-metal, the tendency to abrasion of the rubbing surfaces, through friction, may be reduced, and the wear and tear of the parts proportionately lessened; and that the liability of the rubbing surfaces to become hot, by friction, will be diminished.

The manner in which the compositions are made, is as follows:—1st.—Take 16 parts of regulus of antimony, and melt it in a clean crucible, then add 14½ parts of block tin; when this is also melted, cover the surface of the alloy with powdered charcoal, tallow, or other carbonaceous substance, to prevent it from oxidizing, and bring the whole to a dull red heat. While this operation is going on, 43½ parts of block tin are melted in a separate pot or furnace, of sufficient capacity; and into the molten metal (after taking off the powdered charcoal or other carbonaceous matter), the contents of the first named crucible are poured. The whole is then carefully stirred, so that the metals may be effectually mixed and combined; when this is done, the composition is ready for use, or it may be cast into ingots in the usual manner. Instead of 43½ parts of tin, in the second crucible, as above-mentioned, the inventor sometimes uses other quantities, according to circumstances, as 31¼ parts, 50¾ parts, 58 parts, or 65 parts of tin; but he does not confine himself strictly to these proportions, limiting the range from 45 to 80 parts of tin, with 16 parts of regulus of antimony.

2nd.—Take 16 parts of regulus of antimony, and 14½ parts of block tin, and melt them in the manner before described; then melt, in another pot or furnace, of sufficient capacity to contain the whole mixture, 52 parts of lead, instead of the 43½ parts of block tin, and proceed to mix the metals in the manner before-mentioned. In this composition, the proportion of lead is also varied, according to circumstances, either 39, 52, 65, 78, or 91 parts of lead being used with the above quantities of tin and regulus of antimony; but the inventor does not confine himself strictly to these proportions, limiting the range of alloys from 39 to 91 parts of lead, with 16 parts of regulus of antimony, and 14½ parts of tin.

3rd.—Take 16 parts of regulus of antimony and 14½ parts of block tin, and, while in a state of fusion, add 8 parts of copper, also in a state of fusion; after mixing these intimately, add 43½ parts of block tin, and when the whole is incorporated, pour the melted metal into sand moulds or ingots. The patentee also varies the range of tin from 43½ to 65 parts of tin, to the mixture of 14½ tin, 8 copper, and 16 parts of regulus of antimony: this metal is preferred to be used for sand castings only, and not for those produced from the moulds hereafter described.

4th.—Take 40 parts of block tin, melt it in a clean crucible, and then add 5 parts of nickel; and when intimately incorporated, cast the alloy in moulds or ingots, as before described.

Secondly.—The improved mould or shape for casting or forming steps, bearings, and other parts having rubbing surfaces, is intended to be used for the casting or forming such steps, bearings, and other parts, either of the above-mentioned improved alloys, or of any other easily fusible metal, by which the use of patterns for moulding in sand or loam is dispensed with. For this purpose, the moulds are constructed of iron, brass, or other suitable hard metal; each mould being built up or formed of separate pieces, accurately fitted together, and made in such a manner, that when the parts are joined together, they enclose a hollow space of the form and dimensions of the required finished casting, making due allowance for shrinkage in cooling. Into this hollow space the melted metal or alloy is poured, and when cool, the casting is removed from the mould; the parts of the mould being so disposed that they may be easily separated from each other, for the purpose of disengaging the casting. By thus casting in metallic moulds or matrixes, all the castings from the same mould are exactly like each other in dimensions; and if the moulds be accurately made, the operations of boring and fitting will be unnecessary.

The method of constructing the moulds will be best illustrated by an example:—Thus, suppose it is required to cast a bearing or step for a shaft to run in, of the form shewn in figs. 3, (A, being a side view of the bearing, and B, a transverse section of the same) a block, similar to that shewn in figs. 4, is made for the external part of the mould; C, being a longitudinal section, and D, the end view of the same. The hollow parts, *a, b,* and *c, d,* correspond in form and dimensions with the external shape and dimensions of the casting required, due allowance being made for shrinkage. The internal parts, called the mandril, are made of the form shewn in figs. 5; E, and F, are the flanges, and from *e,* to *f,* is the mandril, which corresponds with the length of the bearing or step. The part between the flanges (shewn in section at *g, h,*) is semicylindrical, and corresponds in diameter with the shaft or axle at the place in which it is intended it should work in the bearings. The flanges of the mandril are made to fit accurately the recesses *c, d,* in the external part of the mould, shewn at fig. 4. When these parts are fixed in their places, as shewn in figs. 6, and are laid on a flat plate (the surface of which has been planed true), a hollow space will be formed within the mould, of the size and shape of the casting required.

In casting a bearing, the metal is to be poured in through the funnel-shaped piece *k,* which has the lower end turned to fit loosely into a hole in the top part *i, i.* This loose funnel-shaped piece (which is termed the "gate") has a longitudinal groove made in it, so as to carry with it, when it is twisted round, the piece of metal which is contained within it, after completing a casting. Previously to pouring in the melted metal, the "gate" is heated separately to a temperature of about 800° Fahr., and inserted in the mould in the manner shewn at fig. 6; and by thus heating the gate, the metal in it will be the last to set or consolidate, and the casting will be prevented from becoming faulty. As soon as the metal is set in the mould, the gate is removed from the mould, after twisting it round so as to detach the piece of metal it contains from the casting; and, by striking the ends *r*, *s*, of the mandril (which are left on for that purpose), the mandril is readily detached from the casting, which is finally removed from the external part of the mould, by striking on a loose metal pin or stamper *p*, fitted into the mould for this purpose. Before the moulds are first used for casting, their inner surface is oxidated, by making them red hot, or by any other known method; or they may be exposed whilst hot to the fumes of burning sulphur, and in that state plunged into a mixture of clay, whiting, and water, or any similar matter, to prevent the metal from adhering to the mould.

The patentee does not claim to have invented metallic chills or moulds generally, but only the metallic moulds for steps, bushes, and other rubbing surfaces of machinery, as above described, and particularly the heated detached piece or gate, as the entrance for the melted metal into the mould, and the stamper, by means of which the casting is removed from the mould.

And, thirdly,—the said improvement in the composition and manufacture of bearings, steps, and other rubbing surfaces, consists in the introduction of a skeleton framing, key, or piece, formed of any kind of hard tough metal, either partially or wholly, into the substance of a bearing, step, or piece, cast from any soft metal or alloy, the surface of which is intended to be exposed to the contact of a revolving or sliding body; such skeleton framing being firmly imbedded in the substance of the aforesaid step or piece, in order that it may serve as a frame-work to support and retain in form the soft metal or alloy composing the aforesaid step or piece; which, being softer, will be more inclined to spread out under pressure than the metal of which the skeleton framing is made. By this improvement, the alloys already described, and other soft alloys or metals, may be used in the formation of rubbing or sliding surfaces, without incurring the risk of disturbance or derangement of the alloy or soft metal by the pressure upon it; providing always that the skeleton is properly proportioned, as to shape and strength, for the duty required from the step or rubbing surface.

The manner of enclosing and applying the skeletons is as follows:—They are first tinned and suspended in the moulds (which may be either such as hereinbefore described, or any other moulds convenient for the purpose), previously to pouring in the melted metal; so that, when the casting is made, the skeleton becomes enveloped in the metal or alloy. These skeletons are made either of brass, cast or wrought iron, or other suitable metal, of a form such as shewn at figs. 7, or any other form convenient for the purpose. In order to tin them, the surfaces are thoroughly cleansed from dirt or oxide, and dipped into a solution of sal-ammoniac, or any of the well known deoxidizing agents; and, when dry, the skeletons are plunged into a vessel of melted tin, so as to tin the whole surface completely,—the tinning may, however, be completed by any other of the known methods. Before the frames are placed in the moulds, they are to be washed in water, and, if necessary, scoured with sand, to remove any foreign matter that may be on them. They are then to be heated to about 600° Fahr., and fixed in the moulds (as shewn in section at fig. 7, where *a*, *a*, is the skeleton framing), and the melted metal is poured into the moulds upon them, and surrounds them,—so forming the intended step or piece. The patentee states, that he does not limit himself to any particular shape or form, or strength of skeleton framing, but adapts the form and strength to the pressure to which each step or piece, with a rubbing surface, is to be exposed. Under this part of the invention he claims the introduction of a skeleton framing key, piece, or block, made of hard metal, into steps, bearings, or other parts of machinery, having rubbing surfaces, and made of soft metal or metallic alloy, for the purpose of supporting or rendering such bearings, steps, or other parts of machinery, more durable.

The last part of this invention refers to the lubricating of bearings, steps, and other rubbing surfaces of machinery, and consists in applying solid tallow, or lubricating material, by pressing it forward against the revolving or sliding rubbing surfaces of machinery, by means of a spring or weight. For this purpose, the lubricating material is formed into a cylinder, or into a parallel bar, and enclosed in a case similar to that used in coach lamps for burning candles. The lubricating material is to be pressed forward by a helical or spiral spring, applied in a manner similar to the spring in a coach lamp, or a weight may be used for the same purpose. It is preferred to have the case of metal, and to fit it in its proper place by springs, catches, or screws, so as to be easily taken away to be cleaned and replenished with a new cylinder or bar of lubricating material. The great advantage which is proposed to be attained by this method is, that of supplying the lubricating material to the revolving or sliding surface, without the necessity of heating the bearings before it flows to supply the necessary quantity required for consumption, which heating is frequently carried so far as to melt the whole supply of material and cause it to run to waste. Fig. 8, shews this plan of lubricating as applied to a railway carriage journal. *a*, is the tube, containing a stick of tallow or other solid lubricating material; *b*, is the journal, and *c*, the bearing; *d*, is a case, to keep out dirt, &c.; *e*, is an enlarged view of a brass ferrule rivetted into the case *d*, for affixing the tube *a*.

The patentee claims the mode, above shewn and described, for keeping the fatty or lubricating material continually in contact with the surface of one of the rubbing parts, by means of a spring, weight, or other equivalent mechanism.—[*Inrolled in the Petty Bag Office, October*, 1845.]

Specification drawn by Messrs. Newton and Son.

To JOHN SOLOMON BICKFORD, GEORGE SMITH, *and* THOMAS DAVEY, *all of Tuckingmill, Camborne, in the county of Cornwall, for certain improvements in manufacturing the miner's safety fuse.*—[Sealed 6th November, 1845.]

THIS invention consists in certain improvements in the manufacture of the safety fuse, for igniting charges of gunpowder when blasting rocks, &c., for which a patent was granted to

William Bickford, September 6, 1831. The fuse consists of a cylinder of gunpowder, in the centre of a rope composed generally of eight, ten, or twelve threads or yarns carefully twisted (in the manner of twine-spinning or cord-making), so as to enclose the gunpowder; the rope is defended by a covering of strong twine, wound on nearly at right angles to the "lay" of the yarns composing the rope (which process is termed "countering"); and the whole is afterwards coated or varnished over. The laying of the yarns is performed by a machine described in the specification of the above-mentioned patent, and called a "monkey;" but only a single fuse can be spun by it at one time. Now, the first part of this invention consists in a novel construction of machine for spinning three or more fuses at the same time.

In Plate XIV., fig. 1, is a plan view, fig. 2, an end view, and fig. 3, a vertical section of a monkey for spinning three fuses at the same time. This machine travels along a table or bench, between two ledges; on the side of one ledge a rack is fixed, having 24 teeth in each foot of its length; and the wheel *a*, of 12 teeth, working therein, is thus caused to rotate when the machine is drawn onwards. The wheel *a*, drives a wheel *b*, having a like number of teeth; on the spindle of the latter wheel, at its upper end, is a crown-wheel *c*, with 52 teeth on its under edge, working into a pinion *d*, of 8 teeth, on the spindle *e*; at the outer end of which spindle there is a cog-wheel *f*, with 18 teeth, working into three wheels *g*, *h*, *i*, of the same size and number of teeth. On the centres of the wheels *g*, *h*, *i*, are wires and crooks *j*, *j*, *j*, to which the yarns are attached; and as the monkey travels along the bench, the yarns are spun into fuses by the rotation of the wires *j*, *j*, *j*. If the cog-wheel *f*, is placed in such a position that a larger number of wheels may gear into it, and such additions are made as will be obviously necessary, four, five, or more fuses, may be spun at one operation.

When the improved monkey is used, the collars and funnels through which the yarns and gunpowder pass, are arranged in the manner represented at figs. 4, and 5; fig. 4, being an elevation, and fig. 5, a plan view. The collars *k, k, k,* are cast in one united piece of brass-work, which is fixed to an upright frame by the screws *l, l*; the centre holes *m, m,* (fig. 5,) receive the gunpowder funnels *o, o*; and through the holes *n, n,* the yarns *p, p,* pass, meeting below, and enclosing the gunpowder as the fuse is spun, *q, q, q,* are the three fuses issuing from the apparatus. The methods of supplying yarns and gunpowder to each collar, and the other general arrangements for spinning the fuses, are the same as those described in the specification of the above-named patent.

The second improvement consists in introducing into the centre of the fuse a strong thread or yarn, smaller and less fibrous than the yarns used for making the fuse. The thread employed for this purpose is that known as No. 135 white-brown thread; it is supplied from a reel, and passing down through the gunpowder in the funnel, is spun into the centre of the fuse by being attached to the monkey with the other yarns;—the central threads are shewn at *r, r, r,* in fig. 4. By the introduction of the central thread, the gunpowder in the lower part of the funnel is constantly kept in motion, and travels on with the thread, so as to flow regularly down into the fuse; and thus the continuity and regularity of the cylinder of gunpowder is ensured.

The third improvement relates to the coating or varnishing of those fuses which are intended for blasting in dry ground, and in close or confined situations, where considerable variations in temperature are experienced. The coating of tar or resin, heretofore applied, burns with much smoke and heat, and is affected by changes of temperature; therefore, in order to avoid these inconveniences, the patentees propose to use a composition formed by dissolving 4 lbs. of the best glue, and 2 lbs. of yellow soap, in 12 gallons of water, by a gentle heat, and then adding 56 lbs. of whiting to give it a body.

The fourth improvement relates to fuses to be used under water. In manufacturing these, it has been usual to add a second "countering," and then to coat or varnish them a second time; but fuses, prepared in this manner, have occasionally failed, in consequence of the varnish becoming hard and brittle on immersion in water, and cracking, and thus admitting the water to the gunpowder. The improved mode of preparing the fuses is as follows:—After the fuse has been coated or varnished with tar or resin, and before the coating becomes hard, the fuse is fastened to "crooks," and made to revolve as if for countering, as described in the former specification,—and a strip of brown paper is wound around the fuse, in a helical form, so as to completely cover it. A thread is wound upon the paper, in order to fix it and prevent shifting; and then a coat of tar or resin is applied to the paper: the fuse is thus rendered perfectly waterproof.

The patentees claim, Firstly,—the improvement in manufacturing fuses by the use and application of suitable arrangements and apparatus, whereby three or more fuses may be spun at the same time, as above described. Secondly,—the improvement in manufacturing fuses by the introduction of a central thread, spun in with the gunpowder. Thirdly,—the improvement in manufacturing fuses by covering such as are to be used in close or warm places, and not under water, with a non-inflammable coating or varnish. Fourthly,—the improvement in manufacturing such fuses as are to be used in or under water, by the application of a second countering of paper and a second coating of tar or resin varnish.—[*Inrolled in the Inrolment Office, May,* 1846.]

To THOMAS WELLS, *of Ware, in the county of Hertford, whitesmith, for improvements in the construction of timber and other jacks, and floor cramps.*—[Sealed 17th May, 1845.]

THE first part of this invention relates to an improvement in screw-jacks for lifting timber. In the screw-jacks heretofore made, the lifting screw has been formed with two or more threads thereon; but, by the present improvement, the lifting screw is provided with a single thread, and made to work in a corresponding female screw, formed in a stationary nut, which is caused to revolve by a toothed wheel or worm gearing into a toothed wheel on the nut, and actuated by a winch handle; in other respects, the jack is the same as usual. The patentee states that, by the application of this improvement, greater weights may be raised, though at a slower speed, and the weight raised will not be liable to run back, as the single-threaded screw will remain in any position in which it may be left, notwithstanding very great weights are sustained thereby.

The second part of the invention relates to the construction of jacks for roasting meat. In Plate XVI., fig. 1, represents the improved roasting-jack, with one side of its case removed to shew the interior. It has a main spring and train of wheels, similar to those heretofore used in this description of jacks. *a*, is the case of the jack, which is hung before the fire by means of a loop *b*, at the top of the tube *c*; and the fly-wheel and meat are suspended from the loop *d*. *e*, *e*, are worsted threads, fastened at their upper ends to the loop *b*, and at their lower ends to the spindle *f*; on this spindle are two pinions *g*, *h*, which are alternately driven by the toothed wheel *i*; and it is the application of this description of wheel which constitutes the novelty of the present improvement. The wheel *i*, is shewn detached at figs 2, and 3, (figs. 2, being an edge and face view, and fig. 3, a back view of the same); a series of teeth *j*, are formed upon its face, and the first tooth, j^1, is provided with a spring, to prevent it from being injured by striking forcibly against the teeth of the pinions *g*, and *h*. Continuous rotary motion is communicated to the wheel *i*, from the main spring in the case *k*, by the following means:—The main spring is attached at one end to the case *k*, and at the other to the axis *l*; to this axis a ratchet-wheel *m*, is keyed, and a cog-wheel *n*, is mounted loosely thereon, but is caused to accompany the axis, when it rotates in one direction, by means of the spring catch *o*. Hence, when the main spring has been wound up, it will exert its power to turn the axis *l*; and as the wheel *n*, is held by its catch *o*, taking into the teeth of the ratchet-wheel *m*, it will be carried round with the axis, and communicate motion through the wheelwork *p*, *q*, *r*, *s*, to the pinion *t*, on the axis of the wheel *i*. The wheel *i*, as before mentioned, alternately drives the pinions *g*, and *h*, on the spindle *f*, to the lower end of which the loop *d*, is attached.

The third part of the invention consists in a novel combination of parts for cramping boards in laying down floors. Fig. 4, is a side view, and fig. 5, a transverse view of the apparatus. *a*, is the frame of the apparatus, and *b*, a screw by which the frame is securely fixed upon a beam or rafter *c*, near the edge of the board *d*, to be cramped. *e*, is a bolt with a flat plate *f*, at its end, which presses against the edge of the board; the bolt slides in a socket *g*, and motion is communicated to it by the cam or curved surface *h*, fixed on the axis of the lever *i*. Great power will thus be obtained for cramping the board; and by the addition of a ratchet-wheel *k*, and click *j*, the bolt *e*, is prevented from sliding back, when the lever is released from the hand of the workman.

The patentee does not claim any of the parts separately; but only the mode of combining the parts into an instrument, as described.—[*Inrolled in the Inrolment Office, November,* 1845.]

To GEORGE PHILCOX, *of High-street, in the borough of Southwark, chronometer maker, for improvements in the construction of chronometers and other timekeepers.*—[Sealed 25th April, 1846.]

THESE improvements in chronometers and other timekeepers consist in a novel construction or adaptation of the spring or springs by which the mechanism of the timekeeper is impelled. By this invention, it is intended to rectify an error which exists in the ordinary constructions of the springs of marine timekeepers, arising from the variations of temperature, and consequent expansion or contraction of the metal in different climates. This is effected by constructing the chronometer spring of two parts, or by adapting two springs in conjunction; so that, as one of the springs, or one portion of the spring, expands or contracts, from the variations of temperature, the other spring, or portion of the spring, equally expands or contracts at the same time and in the same degree, but in an opposite direction,—whereby the previously existing error is effectually neutralized; and the chronometer, if correct in all other parts of its construction, is enabled to keep a uniform rate of going in all climates and under all temperatures.

In Plate XVI., several views of a chronometer spring are shewn, as constructed on the improved principle. Fig. 1, represents, in elevation, mounted in its bearings, a double helical spring *a*, and *b*, which is attached at its outer extremities to the forked bracket or stud *c*, and at its inner extremities is made fast by pinning it to a collet or adjustable bar *d*, fixed upon the spindle or staff *e*. *f* is the compensation balance, likewise affixed to the staff. This attachment of the double spring is better seen in the detached horizontal view of the staff and spring at fig. 2. The same parts and arrangements, as shewn at fig. 1, are represented with the cock and plate in the horizontal view, fig. 3, and referred to by similar letters.

Figs. 4, and 5, represent the double helical spring complete and in action, with the compensation balance drawn in section. The upper portion of the spring *a*, it will be seen, is, in fig. 4, collapsed, whilst the lower portion of the spring *b*, is expanded. In fig. 5, the lower portion of the spring *b*, is collapsed, whilst the upper portion of the spring *a*, is expanded; and, as the balance vibrates, the elastic force of these two portions of the spring constantly act in opposition to each other, and thereby neutralize the error which would be caused by the variations of temperature, as described above.

The patentee states that he does not confine himself to the adaptation of a helical spring or springs, in the way shewn, as the same principle might be carried out with convolute or spiral springs; but that which he claims is, the employment of a double spring to chronometers, so formed and adapted, that whilst the one-half of the spring is opening, the other half of the spring shall be closing in the same ratio; by which means, the error of a chronometer spring is neutralized when acted upon by variations of temperature.—[*Inrolled in the Petty Bag Office, October*, 1846.]

Specification drawn by Messrs. Newton and Son.

To ANDREW SMITH, *of Princes Street, in the county of Middlesex, engineer, for improvements in coating or covering metals, for the purpose of preventing oxidation.* —[Sealed 11th February, 1846.]

THIS invention of improvements in coating or covering metals, for the purpose of preventing oxidation, relates to that process of coating metals, whereby the articles to be preserved from oxidation are plunged into a bath of molten zinc, and there receive a coating of that metal.

The improvements consist in a new mode of transmitting heat (from the furnace employed for melting the metal) to the vessel which contains the zinc. According to the ordinary method of melting the zinc, and keeping it in a molten state to receive the articles which are required to be coated, the flame of the fire is made to play round the sides only of the pan or vessel containing the zinc; for the refuse particles of the zinc, falling to the bottom of the pan, soon form a thick incrustation thereon: the result, therefore, of allowing the flame to play upon the under surface of the pan, would be, to quickly burn out the bottom. Besides the great loss of heat which is thus occasioned, the direct action of the fire upon the iron pan, or the galvanic action of the zinc, quickly destroys that vessel, and the zinc contained therein is frequently injured by being burnt. To remedy these defects, and allow of the zincing process being carried on with greater precision and economy, the inventor cuts off the connection of the fire, and of the zinc, with the pan containing the zinc; by which arrangement, the galvanic, or electric action, hitherto so destructive to the vessel holding the fluid metal, as also to the metal itself, is prevented, and thus the vessel will be preserved, in a good state, for a much longer period.

The figure in Plate XV., represents, in vertical section, the apparatus for melting zinc, and preserving it in a molten state, at a uniform temperature of about 800° Fahr., to receive the articles to be coated. *a, a,* are the walls, and *b, b,* the fire bars of the furnace; *c,* is a large cast or wrought-iron pan or vessel, provided on its upper edge with a flange, by which it is supported in the brickwork; the bottom and sides of this pan *c*, are surrounded by the furnace flue or flues, and within the pan a smaller pan *d*, of cast or wrought-iron, is suspended by a flange provided on its upper edge. A space is thus left between the sides and bottom of the two vessels, into which space a bath, composed of lead alone, or of lead combined with tin, is placed, for the purpose of receiving the heat of the fire, and transmitting it to the zinc. On the inner face of the pan *d*, is a coating of fire-clay or fire-brick, which is intended to prevent the action of the zinc upon the pan *d*. The space between the two vessels *c*, and *d*, may vary in width; but, from experience, it has been found that, when the lead or tin forms a lining of about 1½ inches in thickness, between the two vessels, the heat of the fire will be readily communicated to the inner vessel, and thence to the zinc; and this body of molten lead or tin will suffice to keep up the required even temperature (transmitted from the fire), to the zinc bath.

The application of zinc to the surface of articles constructed of metals forming no part of this invention, it was considered unnecessary to describe the mode of treating the metal articles preparatory to receiving the coating of zinc, such treatment being well known and generally employed in preparing articles for various branches of the industrial arts.

The patentee claims the employment of a bath of lead or tin, or any suitable composition or medium that melts at a lower degree of heat than zinc, by which means the heat from the fire of the furnace is taken up and transmitted to the receptacle containing zinc, for the purpose above set forth.—[*Inrolled in the Petty Bag Office, August*, 1846.]

Specification drawn by Messrs. Newton and Son.

To GEORGE STEPHENSON, *of Tapton House, Chesterfield, in the county of Derby, engineer, and* WILLIAM HOWE, *of Newcastle-upon-Tyne, in the county of Northumberland, mechanic, for an improvement in locomotive steam-engines.* [Sealed 11th February, 1846.]

THE ordinary kinds of locomotive engines are, as is well known, constructed with two horizontal, or nearly horizontal, steam-cylinders, disposed parallel to each other, either between or outside the wheels of the engine; the present improvement consists in substituting for one of the said steam-cylinders two smaller steam-cylinders, with suitable valves, &c.; the smaller cylinders being of such dimensions that the contents or capacity of the two together will be equal to the contents or capacity of the larger cylinder for which they are substituted. The two small cylinders are placed one at each side of the central line or middle of the breadth of the engine, and at equal distances from that central line; and the remaining large cylinder is situated in the said central line, instead of at one side thereof as usual. The crank-pins belonging to the smaller cylinders are arranged parallel to each other, and pointing in the same direction; and the crank-pin of the central cylinder is so placed, that the direction assumed by its radial line will be at right angles to the direction assumed by the radial lines of the other two crank-pins.

The object and effect of this improvement is to counteract or neutralize any tendency that the oblique action of the several connecting-rods on their crank-pins may have to produce a lateral vibration or rocking motion of the engine upon its supporting springs, when travelling very rapidly; because the oblique direction in which each connecting-rod acts, when the piston is near the middle of its course, causes the exertion of a force either to lift up or press down the guides which retain the joint at the end of the connecting-rod and of the piston-rod in its intended rectilinear motion; and in the common locomotive engines, with two steam-cylinders, this force operates alternately at opposite sides of the central line of the engine, and consequently tends to produce the lateral vibration or rocking motion above mentioned. But this tendency to produce lateral vibration will be wholly counteracted or neutralized in locomotive engines constructed according to this improvement; because the central steam-cylinder, with its connecting-rod, is operative at the middle of the breadth of the engine, and therefore the lifting or depressing force resulting from the oblique action of that connecting-rod will act equally on both sides of the engine; and further, as the pistons of the two small cylinders act simultaneously, and in the same direction, the lifting or depressing forces which may result from the oblique action of their connecting-rods are equally operative at the same time, and in the same direction, at opposite sides of the said central line, and at equal distances therefrom, and will therefore have no tendency to produce lateral rocking.

In Plate XV., fig. 1, is an elevation of an improved locomotive engine; fig. 2, is an end view, partly in section, of the three steam-cylinders, with their valves and accessaries, on an enlarged scale; and fig. 3, is a corresponding horizontal section and plan of the same parts. The ordinary parts of the locomotive engine being well known, any description thereof is unnecessary. *a*, is the central steam-cylinder, situated beneath the boiler. *b*, is the uppermost of the two guides for directing the motions of the joint by which the end of the central piston-rod is attached to the forked end of its connecting-rod; the other end of this rod is secured to a crank at the centre of the axis *c*, of the driving-wheels. d, d^1, are the two small steam-cylinders. *e*, *e*, are the guides for the joints of the piston-rods: each joint is connected by a rod *f*, with a crank-pin *g*, on the nave or boss of each driving-wheel. The requisite distribution of steam to the cylinders a, d, d^1, may be performed by means of sliding-valves, and working gear, in the usual manner, but so that the valves of the two cylinders d, d^1, will always be moved simultaneously in the same direction, which may be done by the working gear, without requiring any other excentrics on the main shaft *c*, than is usual. In fig. 2, the valves are represented as sliding against vertical surfaces at the sides of their respective cylinders, in order that the valve-rods may point directly to the central line of the main shaft *c*; which arrangement of valves (as well as the arrangement of all the wheels *h*, *i*, *j*, beneath the cylindrical part *k*, of the boiler) forms part of certain improvements in locomotive engines, described in the specification of a patent obtained by Robert Stephenson, June 23rd, 1841; but although that arrangement of valves (and of the six wheels) is suitable for engines constructed according to the present improvement, the valves may be caused to slide against horizontal surfaces, and the wheels may be arranged beneath the engine in the usual manner. *l*, (figs. 2, and 3,) is the steam-chest or valve-box containing the slide-valve *m*, for the central cylinder *a*; and *n*, is the valve-rod, which passes through a stuffing-box in the end of the steam-chest. *o*, is the steam-chest containing the slide-valve *p*, for one of the small cylinders *d*; and *q*, is the valve-rod. The steam-chests *l*, and *o*, form one space for containing steam, which is conveyed from the boiler into it by the pipe *r*, and is alternately admitted into one or other of the cylinders *a*, and *d*, by their slide-valves. *s*, is the steam-chest of the cylinder d^1, which is supplied with steam from the boiler by the pipe *t*; and *u*, is the rod of the slide-valve belonging thereto. The waste steam is carried off from the cylinder *a*, by the eduction passage *v*, and from the cylinders *d*, d^1, by two passages *w*; these passages are continued by pipes, also marked *v*, and *w*, into the smoke-box *x*, where they are turned upwards, in order to discharge the whole of the waste steam up the chimney, as usual. The two steam-pipes *r*, and *t*, are branches of one common steam-pipe, to which they are united in the smoke-box; and the supply of steam through this pipe is regulated in the ordinary manner by a valve, the handle of which is seen at the end of the boiler within reach of the engine-man.

The working gear for moving the three slide valves is of the ordinary kind, and is actuated by four excentrics on the main axis *c*; one pair of excentrics being used for working the slide valve of the central cylinder, and the other pair for working the slide valves of the two small cylinders.

The locomotive engine shewn at fig. 1, is designed to run upon narrow guage railways, and for that purpose the two small cylinders are fixed outside the framing; but when this construction of engine is required for broad guage railways, the small cylinder may be placed within the framing; and in this case the connecting-rods of the two small cylinders, instead of being attached to crank pins on the driving wheels, are connected to cranks formed on the axis *k*, within the framing. In place of one central steam cylinder, two small cylinders may be substituted; so that there will be four small cylinders, the piston-rods of which are connected by rods with four cranks on the main axis; the cranks of one pair of cylinders being fixed at right angles to the cranks of the other pair. The present improvement is also applicable to locomotive engines mounted on four wheels, and to locomotive engines having four or six of their wheels connected by rods ,in the ordinary mode of coupling.

The patentees, in conclusion, state, that their invention consists in the improvement, hereinbefore described, of applying the steam cylinders, with their pistons, piston-rods, connecting-rods, and crank-pins, in a locomotive engine, so that there shall be two steam cylinders, connecting-rods, and crank-pins, disposed at equal distances on each side of the middle of the breadth of the engine (or of the rails whereon it is to travel); those two connecting-rods acting on the said crank-pins with like motion, in the same direction, one as the other, at the same time, to urge their crank-pins onward in their respective circular orbits. And also, that there shall be one large steam cylinder, with its piston, piston-rod, connecting-rod, and crank-pin, situated at the said middle of the breadth of the engine, or of the rails, in the manner of what has been hereinbefore termed a large central steam cylinder. Or otherwise, in place of such large central cylinder, two small steam-cylinders, with their pistons, piston-rods, connecting-rods, and crank-pins, disposed at equal distances on each side of the said middle of the breadth, but as near thereto as conveniently can be. In order, by such application of the three or four connecting-rods, and corresponding crank-pins, as aforesaid, to counteract or neutralize all tendency that the oblique action of the several connecting-rods, on their respective crank-pins, may have to produce a lateral vibration or rocking motion of the locomotive engine, from side to side, on its supporting springs, when travelling with rapidity.—[*Inrolled in the Rolls Chapel Office, August,* 1846.]

To Alfred Vincent Newton, *of the Office for Patents, 66, Chancery-lane, in the county of Middlesex, mechanical draughtsman, for an invention of certain improvements in machinery for manufacturing India-rubber fabrics,—being a communication.*—[Sealed 28th August, 1845.]

This invention, as communicated to me by my foreign correspondent, relates, firstly, to an arrangement of machinery for the preparation of India-rubber, to render it suitable for being worked up into corrugated or "shirred" goods or fabrics; and, secondly, in machinery for manufacturing corrugated or "shirred" India-rubber goods.

In Plate XVI, figs. 1, 2, and 3, represent the machine, which constitutes the first head of this invention, and is intended to be employed for dividing sheets of India-rubber into threads. Fig. 1, is a side view of the machine, fig. 2, a plan view, and fig. 3, an end view of the same; *a, a*, is the framing, which supports the various parts of the machine; *b*, is a trough, placed in the middle of the machine, and intended to contain water. On the left hand end of the framing a weighted roller *c*, is mounted, and upon it the sheet of India-rubber to be cut into threads is wound. Immediately above the trough *b*, is a roller *d*, furnished with circular knives or cutters; the axle of this roller turns in bearings on the framework, and at one end it is furnished with a worm *e*, for actuating certain machinery, to be presently explained. *f, f*, are standards, affixed to the top of the framework *a, a*, forming guides and supports for the adjustable rollers *g*, and *h*, the axles of which turn in their respective bearings or brasses 1, and 2, between the guides of the standards *f*. *g*, is a metal roller, provided with grooves, for receiving the edge of the knives of the lower roller *d*; this roller *g*, is intended to revolve in the same direction as the knives, and at a velocity of about 1 to 100 revolutions of the latter. *h*, is a smooth metal roller, pressing upon *g*, and over it the sheet of rubber passes from the weighted roller *c*, as will be best seen at fig. 4, which is a diagram representing the course of the India-rubber through the machine. By this means, the sheet of India-rubber will be delivered to the rotary cutters or knives in an even and uniform manner. The mode of regulating the position of the rollers *g*, and *h*, will be seen by reference to fig. 1, in which the bearing 1, carrying the roller *g*, is raised by the screw 3; and the bearing 2, which carries the roller *h*, is suspended by the screw 4. There is also a right and left-handed screw 5, the ends of which take respectively into the bearings 1, and 2, and, on being turned round, draw these bearings nearer together, or force them further apart; thus ensuring a nice adjustment of the rollers. Both ends of the rollers are, of course, similarly provided for adjustment. At the right hand end of the framing, brackets *i*, *i*, are attached, to carry the roller *k*, and spool *l*, the latter of which receives the India-rubber after it is cut into strips or threads. On the axle of the roller *k*, is a bevil-wheel *m*, which takes into another bevil-wheel *n*, mounted on a horizontal shaft *o*, supported by the bracket *i*, and standard *f*, (see fig. 1). The other end of this shaft *o*, is provided with a worm-wheel *p*, which takes into a worm *q*, on a vertical shaft *r*, having its bearings in the standard *f*, and the framing *a*.

At the lower end of this shaft is a worm-wheel *s*, which takes into the worm *e*, on the shaft of the cutting-roller *d*. To the other end of the shaft of this roller *d*, a driving pulley *t*, is keyed, which, when actuated, drives the whole machine, as will be now explained. Any given quantity of sheet India-rubber having been supplied to the roller *c*, and the trough *b*, immediately below the roller *d*, having been filled with water, to keep the knives or cutters wet as they rotate, the sheet of India-rubber is drawn over the smooth roller *h*, (see fig. 4), round the grooved roller *g*, and thence conducted to the roller *k*, which is covered with India-rubber, and is intended to keep the threads at a slight tension, until wound up by the spool *l*, which is provided with a flange or disc at each end, to prevent the threads from slipping off. The machine being now in a condition to work, motion is communicated by any first mover to the pulley *t*, which causes the cutting roller to rotate with great speed, and, by means of the worm *e*, gearing into the worm-wheel *s*, give motion to the vertical shaft *r*, and thus, through the worm and pinion *q*, *p*, and the bevil-wheels *n*, and *m*, cause the roller *k*, to draw forward the sheet of India-rubber between the circular knives of the roller *d*, and the grooved roller *g*, and wind it up as fast as it is cut into strips or threads. The slow rotary motion of the roller *g*, requisite for the proper performance of the cutting operation, is communicated thereto by means of an oblique toothed pinion *u*, on the shaft of that roller taking into the worm *q*, of the shaft *r*. On the further end of the shaft of this roller *g*, is a cogged wheel *v*, which takes into a wheel *w*, on the shaft of the roller *h*, and causes it to revolve at a proper speed for passing the sheet of rubber forward at the same rate as the roller *g*.

It will now be seen, that as fast as the sheet of India-rubber is drawn between the rotary knives or cutters and the grooved roller, it will be cut up into strips or threads; the knives being always wet and not liable to clog. The roller *g*, may be made of any suitable metal, but the grooves must be turned quite true, and of such a width as to allow of the edge of the cutting knives just fitting, with space enough to prevent friction from the vibration of the knives.

The second head of the invention, viz., the machinery for working up the India-rubber threads into shirred or corrugated fabrics, will be seen on reference to figs. 5, and 6. The object of this part of the invention is to stretch the threads of India-rubber to any desired length, and to cover the said threads with cloth on both sides. Fig. 5, is a side elevation, and fig. 6, a partial section of a machine to be employed for this purpose. *a*, *a*, is the frame-work; *b*, and *c*, are two rollers of wood or iron, mounted in suitable bearings; that of *b*, being fixed, and *c*, capable of adjustment, by means of screws 1, 2, in the side frames. These rollers are covered first with a solution of India-rubber, then with a thin sheet of the same, over which one or more thicknesses of cloth or felt, or other suitable fibrous yielding substance, is rolled; the whole varying in thickness from one-eighth to half an inch, and being firmly attached by cement, impart to the rollers an elastic crust or covering: these rollers are called the compressing-rollers. *d*, is a drum, placed at the upper extremity of the frame, and having its bearings in the side frames. This drum should be of the same diameter as the compressing-rollers *b*, and *c*, after they are covered with their elastic crust; and it must be covered with sheet-rubber, to prevent the threads from slipping when passing over it. The drum *d*, in connection with a spool *e*, (with which it is in immediate contact), serves to give tension to the threads of rubber during their passage from the spool, by reason of the threads passing round and laying flat on the surface of the drum. Attached to one end of the shaft of the drum *d*, is a bevil-wheel *f*, of such relative size as may be required, reference being had to the degree of tension intended to be given to the threads. *i*, is a shaft, mounted diagonally on brackets from the framing, in a line with the centre of the roller *b*, and the wheel *f*. On the upper end of this shaft is a bevil-wheel *g*, which takes into the large bevil-wheel *f*; and the lower wheel *h*, gears into a small bevil-wheel *k*, keyed fast on the shaft of the roller *b*. By this arrangement the drum *d*, is made to revolve only one-half, or one-third as fast as the rollers *b*, and *c*, (as may be required); whereby an uniform tension is given to the threads of India-rubber. The spool *e*, is provided with flanges at each end, similar to that marked *l*, in the former machine; and as it rests on the drum *d*, the flanges will prevent any injurious lateral motion, and also permit the spool to descend as the threads pass off and lessen its diameter. Of these spools there should be several, in order that when the India-rubber is expended, the machine may be quickly supplied with fresh thread. Each of these spools is provided with an elastic apron (seen in figs. 7,) of sufficient length that it will, at tension, reach from the upper part of the machine to the compressing-rollers; its object being to deliver the threads down to their very ends to the compressing-rollers. On the end of the apron is a plate *w*, to which a thread-holder is attached by a long pin or wire, as shewn; thus forming a kind of hinge-joint or fastening. *l*, *l*, are small rollers, resting in bearings on the frame-work; their use being to deliver off, as required, the cemented cloth which is used in forming the corrugated fabric.

By referring to fig. 6, the position of the compressing-rollers, and other parts of the machine, will be more clearly seen. *m*, is a metal comb, the pins of which are placed at equal distances apart; this comb is fixed to the framework, and is intended to guide the threads after they leave the friction-drum *d*. A similar comb is also required in the beaming process, when the threads are being wound on the spool. *n*, is a comb or guide, made of thin plate iron, with notches in one edge, at uniform distances apart, to guide the threads evenly and truly in their passage from the friction roller *d*, to the compressing rollers, and also to prevent the passage of twists in the threads; *o*, *o*, are loose rollers, over which the threads pass, and are used to prevent too great a pressure on the combs, and in connection with them, to prevent twists in the threads from passing to the compressing rollers. *p*, is a large drum, mounted in bearings in the framework, and actuated by a belt passing round a small pulley *q*, on the shaft of the compressing roller *b*, and round a pulley *r*, on its own axle. This drum is of such a calculated diameter as may be required (reference being had to the length of the threads), and is used to wind up the formed goods at nearly full tension; its object being to keep the threads and cloth at full tension, until a second pressing between the elastic rollers can be effected, which gives a more perfect finish to the goods. This second pressing is given by simply reversing the motion of the machinery, after the piece of goods is formed, and before it is removed from between the elastic rollers. *s*, is a spool, resting upon the drum *p*, and intended to receive the fabric as it is drawn off by that drum; to the spool *s*, an apron *t*, of any desirable textile fabric is attached, and of such a length as will reach up to the bite of the compressing rollers. On the end of this apron is securely fastened a thin plate of metal *u*, as shewn at figs. 7, to which one of the thread holders *v*, (seen also in the same figures) is attached: these thread holders are somewhat similar to the plates *w*, and *u*, but have a series of small holes, about one-eighth of an inch apart, more or less, made through them. The threads of India-rubber are secured to the holder *v*, previous to their being beamed up on the spool, by drawing their ends through the small holes, and making a knot in the ends of the threads. By this method of introducing the India-rubber threads to the machine, the piece of formed or finished goods can be removed from the machine, by simply detaching the plates, and cutting off the threads just at their junction with the plates.

Having pointed out the various working parts of the machine for making corrugated fabrics, the patentee proceeds to describe the mode of working the same. The holders *v*, being filled with India-rubber thread, as before mentioned, the end v^1, is attached to the apron of the spool *e*, and the threads are wound upon that spool, leaving just enough unwound to pass round the friction-drum *d*, over the loose rollers *o*, *o*, and to reach the compressing rollers *b*, *c*, where a junction is effected between the holder *v*, and the plate of the apron on the spool. The rollers *l*, *l*, being supplied with the cemented fabric which is employed for covering the India-rubber threads, are now to be placed in the machine, as shewn in the drawing, and the end of these cemented fabrics are drawn forward to the bite of the compressing rollers. Rotary motion is then communicated to the machine by a winch-handle *x*, keyed upon a stud, which is supported by a bracket from the framework. Upon this stud is a pinion *y*, which, gearing into a cog-wheel *z*, mounted on the axle of the compressing roller *c*, communicates motion thereto; and the wheel *z*, being also in gear with a wheel, z^1, of similar pitch, on the axle of the roller *b*, both the compressing rollers will revolve at the same speed.

The rotation of the roller *b*, will, by means of the bevil-wheel *k*, on its axis, communicate motion through the bevil-wheels *h*, *g*, and *f*, to the friction drum *d*, which will cause the spool *e*, to unwind, and allow the threads to be drawn down between the pressing rollers. It will now be seen that, as the compressing rollers revolve, the threads of India-rubber will be brought down from the spool *e*, and the fabric from the rollers *l*, *l*, will be made to close upon them (the cemented side of the fabric being inwards), and thus make a solid and compact fabric, which, as it passes from between the rollers *b*, and *c*, is taken up nearly at full tension by the drum *p*, and wound on to the spool, *s*.

As the principle by which, in this invention, the threads of India-rubber are stretched or elongated, consists in the combination of rollers or drums, the patentee does not limit himself to making the friction-drum or roller of the same diameter as the compressing rollers, and to revolve at slower speed, for the same result can be obtained by constructing the friction drums, or rollers, of less diameter than the compressing rollers; in which case, such gearing may be attached as to cause the friction and compressing rollers to revolve with the same speed upon all their respective axes or shafts. Again,—the friction necessary to create sufficient tension of the threads could be obtained by two rollers, placed nearly in contact (revolving as above described), which, tightly squeezing the elastic threads, would prevent them from slipping.

By the method, above described, of stretching the threads of India-rubber, only that part of the thread is elongated, at the same time, which is in immediate contact with the forming part of the machine; whereby, the difficulties of the threads breaking, flying back, and entangling, are said to be completely overcome, and the work is accomplished in much shorter time, and without waste, or the necessity of tying knots, or taking out threads, as is required by the old method, where the whole length of the threads are kept in a stretched state till the combination with the cloth which covers them is effected. Instead of employing the elastic compressing rollers *b*, and *c*, the inventor has found that metal rollers, grooved in the manner shewn at fig. 8, may be very advantageously employed; for, by grooving the rollers so as to receive the threads of India-rubber without crushing them, a similar advantage to that given by the elastic rollers is retained; and, in addition thereto, a more perfect compression of the fabric is obtained, as will be readily understood by persons acquainted with the manufacture.

In conclusion, the patentee states, that he lays no claim to the employment of circular cutters or knives, when unconnected with the improved arrangement of machinery for cutting threads of India-rubber; nor does he, under the second head of the invention, claim, separately, any of the various parts in the arrangement of machinery, above described and shewn in the drawings. But, that which he desires to secure is, First,—the employment of a series of knives or cutters in combination with a small grooved roller, upon which the sheet of India-rubber to be cut is pressed in a smooth and even state, as above explained; by which arrangement the sheet may be divided into threads, suitable for being worked up into India-rubber fabrics. Secondly,—with respect to the machinery for stretching threads of India-rubber, and covering the same with suitable textile fabrics, he claims the general arrangement of machinery as above described, and set forth in the drawings.—[*Inrolled in the Petty Bag Office, February,* 1846.]

Specification drawn by Messrs. Newton and Son.

To THEOPHILE AUGUSTE DRESCHKE, *of the Rue Therese, in the city of Paris, late an officer of artillery in the service of Prussia, and late professor of sacred music at the University of Berlin, for improvements in the keys of piano-fortes and other keyed musical instruments.*—[Sealed 31st July, 1846.]

THIS invention consists in a new mode of forming the keys of piano-fortes and similar musical instruments, or it may be termed a new description of key-board.

In Plate XIV., fig. 1, is a plan view of part of the key-board of a piano-forte, constructed according to this invention; and figs. 2, and 3, are side views of the two kinds of keys used. On each key four different stops are fixed, viz., an oblong stop *a*, a pentagon *b*, a hexagon *c*, and an oblong *d*, as in the key shewn detached at fig. 2; or else an oblong *e*, a hexagon *f*, a pentagon *g*, and an oblong *h*, as at fig. 3. The length of the first stop *a*, or *e*, is equal to the breadth of a finger; and its breadth is half that of the hexagon *c*, or *f*.

The breadth of the pentagon *b*, or *g*, and of the hexagon *c*, or *f*, is one sixth of that of an octave upon an ordinary key-board, but it can be reduced to the breadth of a common white piano-forte key; and the length of the pentagon and hexagon is equal to the diameter of a circle described around the hexagon. The breadth of the fourth stop *d*, or *h*, is equal to that of the first stop *a*, or *e*; the length will depend upon the construction of the instrument, but it must not be so short as to impede the movements of the hands. The first stop *a*, or *e*, is lower than the three others, *b*, *c*, *d*, or *f*, *g*, *h*, which are on the same level. The number of the keys will of course depend upon the construction or range of the instrument to which the key-board is to be applied.

When made according to this invention, the key-board consists of two portions *i*, *j*, *k*, *l*, and *j*, *m*, *n*, *k*, the surfaces of which are arranged at different levels to each other (the sides of each stop are rounded); but, for the performance of a piece of music, the key-board may be described as consisting of three parts, *i*, *j*, *k*, *l*,—*j*, *o*, *p*, *k*, and *o*, *m*, *n*, *p*. The first and third parts each contain the chromatic gamut, with the notes in regular succession. The second part, which presents four rows of stops, contains the chromatic gamut, arranged in zig-zag order; each note in this part has two stops, consisting either of a pentagon in the first row and a hexagon in the third, or a hexagon in the second and a pentagon in the fourth row. The keys are white, but some of them are marked with black dots; the notes marked with large dots are the *la* and the *mi flat*, and the small dots indicate the *ut* and the *fa sharp*.

In his specification the patentee has omitted to state the utility of his invention,—we must therefore assume that the object he intends is to give the performer greater facilities in striking the keys, by providing for the fingers a point or stop on which to strike, whatever portion of the length of the key may be under the performer's fingers.—[*Inrolled in the Inrolment Office, October,* 1846.]

To James Murdoch, *of Staple Inn, in the county of Middlesex, mechanical draughtsman, for an improved process for preparing a certain material for the purpose of painting,—being a communication.*—[Sealed 11th February, 1846.]

This invention relates to the manufacture of oxide of zinc, to be used in painting as a substitute for white lead. In the ordinary modes of manufacturing oxide of zinc, air is admitted into the retort or vessel containing the zinc, and the metallic vapours becoming inflamed by contact with the air, oxide of zinc is formed, part of which is deposited in a series of pipes leading from the retort, but the largest portion remains in the retort, and can only be collected in an impure state. The improvements consist, firstly, in preventing the access of oxygen to the bath of zinc, or to the materials furnishing the zinc, contained in the retort or vessel, by burning the metallic vapours outside the vessel in which they are generated; secondly, in causing the air charged with the oxide to pass through sieves permeable to the air, but impermeable to the oxide; thirdly, in creating a strong current of air (by a blowing machine or any other suitable means) through the chambers in which the oxide is produced and collected, for the purpose of renewing the air, in order to facilitate the production and collection of the oxide.

In manufacturing oxide of zinc by the improved process, the patentee employs five chambers, viz., the retort chamber, the air chamber, the oxidating chamber, the collecting chamber, and the inspection chamber. The first-mentioned chamber contains the furnace in which the retort or generating vessel is set, and in it the operations of charging and clearing the furnace and retort are performed. The retort or generator for receiving the zinc or ore is made of earthenware, capable of standing a white heat; it has two apertures, one for the purpose of charging and clearing it (which aperture is to be hermetically sealed during the distillation, to prevent the entrance of air), and the other for the metallic vapours to escape through into the oxidating chamber. The air-chamber communicates with the external atmosphere, and is fitted with screens of cloth or wire gauze, which allow the air to pass, but arrest all extraneous particles suspended in it, so that the air will pass from this chamber into the oxidating chamber in a pure state. In one side of the oxidating chamber is inserted the hinder end of the retort, having an aperture formed in it, as above-mentioned; and on the metallic vapours reaching the edge of this aperture, they take fire by contact with the current of air that enters from the air-chamber. The white fumes resulting from this combustion are oxide of zinc, commonly known as flowers of zinc, and are carried by the current of air into the collecting chamber. From this chamber a flue leads to the chimney of the furnace (or any other means of creating a draft may be employed), and before the opening of the flue sieves of cloth or wire gauze are placed, which permit the air to pass, but arrest the oxide of zinc;—the sieves should be shaken either constantly or at intervals to detach the oxide, which would otherwise obstruct the current of air. The inspection chamber is situated on the opposite side of the oxidating chamber to that where the end of the retort is inserted. In the wall which divides these chambers two apertures are made, commanding a view of the aperture in the retort, one of which is fitted with an eye-piece of colored glass, to soften the glare of the inflamed metal, and the other is furnished with a small door, in order that an instrument may be introduced through it to clear the aperture in the retort, if it should get plugged up.

The patentee claims, Firstly,—manufacturing oxide of zinc without allowing the air to come in contact with the bath of zinc, by causing the vapours of zinc to be burnt outside of, or after leaving the vessel in which they are generated. Secondly,—causing the air to pass through sieves, to free it from impurities, and to cause it to deposit the oxide in the collecting chamber. Thirdly,—creating a strong draft or current of air through the air chamber, oxidating chamber, and collecting chamber, by a draft chimney, ventilator, or any other suitable means. Fourthly,—the application of a current of air, which has been purified by passing through sieves, to the collection of the flowers or oxide of zinc in the process of obtaining zinc from the ores containing it, which oxide is now lost during the melting of the metal.—[*Inrolled in the Inrolment Office, August,* 1846.]

To JOHN MERCER, *of Oakenshaw, Clayton-le-Moors, in the county of Lancaster, chemist, for certain improvements in scouring and clearing wool and woollen fabrics; also in bleaching and clearing silk, cotton, and linen, and other fabrics.*—[Sealed 2nd May, 1846.]

THESE improvements in scouring and clearing wool and woollen fabrics, and in bleaching and clearing silk, cotton, linen, and other fabrics, consist in using the phosphates and arseniates of potash, soda, and ammonia, along with the materials commonly employed for those purposes; which materials are the carbonates of potash and soda, ammonia, soap, and urine.

Any of the phosphates or arseniates of potash, soda, or ammonia, will answer; but the patentee prefers the sub-phosphate or sub-arseniate of soda. He prepares these salts by dissolving equal weights of phosphate of soda and soda-ash, or arseniate of soda and soda-ash, in hot water, and evaporating the clear solution to a crystallized state or powder. These salts are distinguished by the terms P, *(phosphoric)* scouring salt, and A, *(arsenic)* scouring salt. In using them, one part of scouring salt is added to one, two, three, or more parts of the soap, soda, or other material; and the process is conducted in the ordinary manner.

The patentee claims the use and application of the various phosphates of potash, soda, and ammonia,—and also the arseniates of potash, soda, and ammonia, to be used either alone, or in addition to the substances usually employed in scouring, bleaching, and cleansing woollens, cottons, silk, and other fabrics.—[*Inrolled in the Inrolment Office, October,* 1846.]

To WILLIAM CORSCADEN THOMPSON, *of Liverpool, in the county of Lancaster, master mariner, for an invention of certain improvements in machinery or apparatus for propelling vessels on water,—being a communication.*— [Sealed 20th November, 1845.]

THIS invention consists in the application, employment, or use of one or more paddle-wheels, of peculiar construction, placed in water-tight cases, and projecting through the sides, bilges, or bottom of a vessel. These wheels differ from the common paddle-wheels, inasmuch as the central part, for about three-fourths of the diameter of the wheel, consists of a hollow water-tight drum, to the periphery of which the floats or paddles are attached. The axis or shaft on which these wheels revolve, passes through stuffing-boxes into the vessel, and to it is to be connected the steam-engine or other moving power. It is to be observed that only a small arc of the wheels will project from the vessel, and that the mouth of the apertures will fit as close to the wheels as in practice may be found advisable. These wheels being set in motion, will, it is said, at and above a given velocity, by their centrifugal force, exclude the water from the cases, although they should be situated entirely below the water level, at the side of the ship. Thus, while the part of the wheel outside of the case is acting in the most favorable direction for propelling the ship, the remainder is working in an air-tight chamber, free from water. The advantages said to be derived from this application are, first, whatever may be the immersion, the wheel is always in a favorable position for giving the greatest effect; second, a smaller paddle-wheel is required for taking up the power of the engines than with the old system; third, that this invention will be found of great service in vessels of war.

In Plate XIV., fig. 1, represents, in section, a vessel having a paddle-wheel in the centre, with the driving crank on each side; and fig. 2, is a side view of the wheel in the same position. Fig. 3, is a section of a vessel having two paddle-wheels placed at the bilges, with the crank-shaft between them; and fig. 4, is a side view of the same arrangement. *a*, *a*, are cases or paddle-boxes, attached to the bottom or sides of a vessel; these are made air and water-tight, except at the bottom, where they are open. *b*, *b*, are the driving shafts, which are made to revolve by a steam-engine, or other motive power; *c*, *c*, are the drums or hollow centres of the paddle-wheels; *d*, *d*, are the floats or paddles, attached to the periphery of the hollow drums or centres *c c*. These paddles may either be opened at the sides, as in an ordinary paddle-wheel, or may be enclosed at the sides, as at *f*, *f*, fig. 3, like an overshot water-wheel. The patentee does not confine himself to any peculiar form of paddles; they may be either curved or oblique, or in any position which experience may prove to be best; nor does he limit himself to the form of the cases or boxes in which they revolve. *g*, *g*, are bilge pieces, made somewhat deeper than usual, as a guard to the wheels in shallow water. When it is found desirable to work vessels so fitted under sail alone, the paddles may be lifted up entirely out of the water by any suitable machinery; or one or both paddle-wheels may at any time be engaged or disengaged with the driving power, by means of any well-known or suitable connecting apparatus, without in any way interfering with the invention.

The patentee claims the peculiar arrangement and construction of paddle-wheel or wheels, having the centre formed like a hollow drum or cylinder, and being provided with floats or paddles, attached to the periphery thereof; which propelling wheels or apparatus are to be worked in a water and air-tight chamber (when partly immersed) with the lower portion of the wheel or wheels projecting or dipping into the water; and also the application, employment, or use of such apparatus, for the purpose of propelling vessels on water, whether used in connection with the steam-engine, or any other driving power, or with any connecting or disconnecting apparatus, when the vessel is to be worked under sail only or otherwise.—[*Inrolled in the Petty Bag Office, May,* 1846.]

Specification drawn by Messrs. Newton and Son.

To Edward Augustin King, *of Warwick-street, Charing-cross, in the county of Middlesex, gent., for improvements in the production of magnetic electricity,—being a communication.*—[Sealed 30th April, 1846.]

The first part of this invention consists in constructing the coils for the armatures of magneto-electric machines of plates or strips of rolled copper, instead of the wires hitherto used. The strip of copper is bent round a rectangular or triangular bar of iron, in the following manner:—The strip is first bent over itself at right angles, so as to fit two sides of the bar; at the next corner of the bar it is again bent in the same manner, which brings one of its edges in contact with the third side of the bar; and this bending is repeated at each corner, until the whole of the strip has been wound upon the bar, in the way shewn at fig. 1. The coils are insulated from each other by inserting between them a strip of cotton cloth, saturated with a mixture of bees-wax and resin, which are melted together, in the proportion of 1 lb. of the former, to ¾ lb. of the latter. The size and length of the strip will depend upon the electric power required, and the purposes to which it is to be applied;—for electro-plating, a strip one-twentieth of an inch thick, 1½ inch wide, and 70 feet long, is suitable. When a strip of considerable thickness is used, grooves are formed across it, at intervals equal to the diameter of the iron bar; the width of each groove is equal to that of the strip, and its depth is equal to half that of the strip; and as the surfaces of the strip are reversed at each bend, in forming the coil, the groove is cut alternately on opposite sides, as seen at fig. 2: by means of these grooves, the strip can be bent into the required form without increasing its thickness at the bends.

Fig. 1.

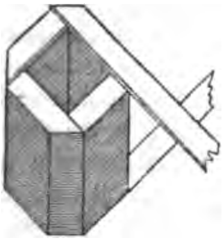
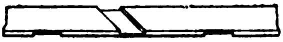


Fig. 2.



The second improvement consists in forming coils for the cylindrical armatures of magneto-electric machines out of circular plates of copper. In the centre of each plate a hole is cut, so as to admit the cylinder of iron which is to be the armature, and a broad flat ring is thus produced; each ring is cut through at one side, and the ends so formed are slightly bent in opposite directions; the ends of a series of rings which have been thus treated are then soldered together in such a manner as to form a helical coil. The solder used is silver solder; and the convolutions are insulated from each other in the same way as the coil previously described.

The third part of the invention consists in a mode of collecting all the currents produced in magneto-electric machines having more than one armature, and using the currents separately, or combining them into two currents. The patentee describes the application of this improvement to a machine containing four magnets, a front view of which is shewn at fig. 3. *a, a,* are the magnets, supported by a circular frame, with their poles directed towards the centre. *b,* is a wheel (indicated by dotted lines) fixed upon the axis of the machine, and consisting of two parallel circular brass plates; the armatures (indicated by the small dotted circles *c, c,*) are on the periphery of this wheel, and when it is put in motion they are thus made to pass between the poles of the magnets. To the axis of the machine a break is affixed, consisting of a thick brass ring (marked *e,* in the enlarged view, fig. 4,) divided into as many segments as there are armatures;—the segments being insulated from each other and from the plate to which they are attached. Upon each segment a steel spring *f,* presses; these springs are arranged equi-distant from each other around the break, and secured in their places by nuts, working on the screw-bolts *g, g,* which pass through the iron ring *d,* fixed to the frame of the machine, but are insulated from the ring; and a copper wire is soldered to each bolt, for the purpose hereafter mentioned.

Fig. 3.

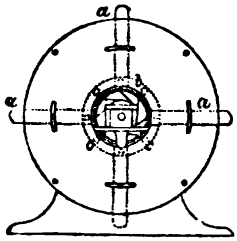
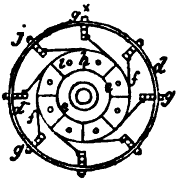


Fig. 4.

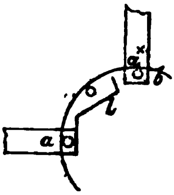


When this apparatus is applied to a machine, the magnets must be arranged so that their poles alternate; the ring *d*, must be so adjusted that the outer end of every alternate spring *f*, (which presses on the break) will be in a line with the centre of the poles of a magnet; and the break must be placed so that every alternate division is also in a line with the centre of the poles of one of the magnets. The terminations of the coils on the side towards the break are connected with its segments by wires or strips of copper (each coil being connected with a separate segment); and the opposite terminations of the coils are connected with a brass ring, termed a "connection ring," which is fixed on a cylinder of hard wood, at the opposite end of the axle to that on which the break is placed; and a spring secured to the frame, but insulated from it, presses upon the ring. The terminations of the coils are connected with the segments as follows:—The wheel *b*, which carries the armatures, is supposed to revolve in the direction of the hands of a watch; and if it be turned until an armature is at the centre of the poles of each magnet, each armature will be in a line with one of the divisions of the break. Now, the armature which would be in a line with the division *h*, has the termination of its coil soldered to the segment *i*; the coil of the next armature is soldered to the next segment; and so on with the rest. When the wheel with the armatures is made to revolve, and the wire from one of the bolts *g*, is brought in contact with a wire attached to the spring that presses on the "connection ring," a current of electricity is found to pass. If the different currents are to be combined into two, the bolt *j*, is connected with the wire from the bolt g*: the wires from the two next bolts are connected, forming a second double wire; then those from the next two, forming a third; and lastly, the remaining pair, forming a fourth double wire. The first double wire is now connected with the third, and on bringing this quadruple wire in contact with the wire from the spring that presses on the "connection ring," a compound current, which passes in one direction, is produced. By connecting the second and fourth double wires, and bringing this quadruple wire in contact with another wire from the spring just referred to, another current, equal in power to the first, is produced. If the currents from the different coils are to be used separately, the wire from each bolt *g*, must be connected with a separate wire from the spring, and a separate decomposing cell used for each.

The fourth improvement consists in a mode of preventing the formation of neutralising currents in the two brass plates constituting the wheel *b*. This is effected by dividing both plates at each armature, from the outer edge to the hole through which the armature passes, by a saw-cut.

The last part of the invention consists in affixing iron bars to the poles of the magnets in magneto-electric machines, in order to multiply the number of times that the armatures are magnetized during one revolution of the machine. The application of this improvement is exhibited in fig. 5. *a*, *a**, are the poles of two magnets. *b*, is a portion of the wheel that carries the armatures. *l*, is a flat bar of soft iron, attached to one pole of the magnet *a*, and bent into the form shewn; it is of the same width as the pole of the magnet, and ¾ of an inch thick. To the other pole of the magnet *a*, another bar is fixed in exactly the same manner. When an armature arrives at the second bend in the bar, it is magnetized from the magnet *a*, which thus acts on it a second time in one revolution. When this improvement is adopted, the number of segments into which the break is divided must be double that of the armatures; the termination of each successive coil being connected with the alternate segment. A spring presses on each segment, and the one in a line with the second bend in the bar is connected with the next group of wires to the one to which it would, from its position, belong. In other respects the mode of collecting the currents is the same as that above described.

Fig. 5.



The patentee claims, Firstly,—the improved method of constructing the coils for the armatures of magneto-electric machines, by forming them of flat strips of copper, instead of wires. Secondly,—the application to magneto-electric machines of a coil formed of plates or rings of copper, soldered together so as to form a *spiral.* Thirdly,—the mode of collecting all the currents produced in machines having more than one armature, by a combination of springs pressing on separate segments of the break, and using the current from each spring separately, or combining them together into two currents. Fourthly,—the method of preventing the formation of neutralizing currents in the brass or metallic plates carrying the armatures, by dividing or cutting through portions of the said plates. Fifthly,—the mode of affixing iron bars to the poles of the magnets in magneto-electric machines, so as to multiply the number of times the armatures are magnetized during a revolution of the machine.—[*Inrolled in the Inrolment Office, October,* 1846.]

To Ernest Edge, *of Manchester, in the county of Lancaster, mechanic, for certain improvements applicable to the wheels and axles of engines, tenders, carriages, and waggons, to be used upon railways.*—[Sealed 20th November, 1845.]

These improvements are intended to be adopted only in such cases where the wheels are mounted upon revolving axles, and are designed to facilitate the transit of carriages over curves or other deviations upon the line of railway. In ordinary locomotive engines, tenders, carriages, or waggons, used on railways, the wheels are *both* "staked," keyed, or fastened upon their respective axles, and, consequently, both wheels revolve with the axles, whilst running; and, as is well known, in the event of passing over curves in the line, their action is not uniform, but subject to considerable friction and abrasion or "twist" against one side of the rails.

This invention consists in so constructing wheels and axles as to obviate this imperfection. The improvement is effected by "staking," keying, or fixing only *one* wheel upon the revolving axis instead of both, and leaving the other wheel loose upon its axis, and at liberty to turn, slip, or even remain for a time quiescent, when occasion may require.—[*Inrolled in the Petty Bay Office, May,* 1846.]

To ALFRED MARKWICK, *of Langham-place, in the county of Middlesex, surgeon, for improvements in the manufacture of epithems, used for medical and surgical purposes,—being partly a communication.*—[Sealed 20th May, 1846.]

THIS invention relates to the manufacture of epithems, for applying fomentations, lotions, embrocations, or other fluids or preparations to the surface of the body, for medical and surgical purposes. The object to be attained is a porous surface, where the epithem comes next the body, and an impermeable surface at the back; and the improvements in the preparation of the epithems consist in the use of sponge, sponge and fibrous materials combined, or fibrous materials alone, for the porous surface, and India-rubber, gutta-percha, or other impermeable matter for the back.

When sponge is used, it is cut into thin slices, which are spread evenly upon a flat surface, and a coating of dissolved India-rubber or gutta-percha is applied to the upper side thereof, and allowed to dry; this coating is repeated several times, until a suitable impermeable surface is obtained; or an impermeable surface may be produced upon the sponge by other methods. If a combination of sponge and fibrous materials is used, the sponge, after being reduced to very small pieces, is mixed with wool or other felting fibre, and the fibres are slightly felted, so as to produce a porous surface which will hold together; this is now coated with a solution of India-rubber or gutta-percha, or otherwise rendered impermeable. Non-felting fibres may also be mixed with the other materials in such quantities as will not interfere with the felting properties of the first-mentioned fibres. When the porous surface is to be composed of fibrous materials only, wool or other felting fibres are employed, either alone or in combination with non-felting fibres, such as cotton, silk-waste, &c. (the object being to obtain a slightly matted or felted surface, which shall be as porous and open as possible); and the solution of India-rubber, gutta-percha, or other impermeable matter is applied thereto.

Portions of the above fabrics are cut out, and attached by strings or bandages to that part of the body which is to be treated; having being first charged with the lotion or other fluid or matter. In cases where only warmth is required to be produced in a particular locality, such as the chest, the use of fibrous materials, with an impermeable back surface, may be resorted to; and then, if not for temporary use, the patentee prefers to cover the back of the epithem with silk or other such fibres; and when desired, the epithem is rendered permeable to the perspiration, by puncturing it. Perforated epithems are also useful in cases where the lotions or liquids employed are required to evaporate freely.

The patentee claims, Firstly,—the mode of manufacturing epithems by employing sponge, with a suitable impermeable back surface, as above described. Secondly,—the mode of manufacturing epithems by employing sponge combined with fibrous materials, with a suitable impermeable back surface. Thirdly,—the mode of manufacturing epithems by employing fibrous materials, so as to produce a porous surface with a suitable impermeable back surface.—[*Inrolled in the Inrolment Office, November,* 1846.]

To WILLIAM NEWTON, *of the Office for Patents,* 66, *Chancery-lane, in the county of Middlesex, civil enginner, for an invention of certain improvements in manufacturing piled fabrics,—being a communication.*—[Sealed 20th January, 1846.]

THESE improvements in manufacturing piled fabrics consist in a peculiar mode or method of forming tufts of worsted and other fibrous materials, and of introducing such tufts in the manufacture of carpets, rugs, and other piled fabrics, for the purpose of producing patterns or devices in every variety of colors and tints on the face of such goods.

In order to render these improvements evident, and their adaptation obvious to the weaver, the patentee traces the course of proceeding with this improved method and apparatus, to the production of a figured piled carpet.

In the first place, a series of yarns are provided, of various colors and gradations of tints, according to the pattern or device intended to be woven in the face of the carpet or other piled fabric. To each of these several gradations of colors and tints, a letter or number is assigned, for the purpose of identifying them, and the respective tinted yarns are each wound upon a distinct bobbin. These bobbins are then mounted loosely upon axles in a creel-table, or other suitable frame, and the ends of the yarns are severally drawn through holes in the creel-table above; to each of which holes a letter or number is applied, answering to the assigned letter or number of the colored or tinted yarn passed through it.

The design or pattern intended to be woven is then provided, which pattern is generally formed by small squares of color, on the Berlin plan. From this squared design or drawing the operator must then read off, by the squares or scale, the situations in which the tufts of the variously tinted yarns are to be placed in the face of the fabric, to produce a corresponding pattern.

In order to apply this reading off of the pattern to the required situations and arrangements of the tufts of yarn, for each of the successive rows of weft or lashes of the weaving, the operator takes strips of card (as many strips in all as the amount of lashes required to complete the whole length of the pattern), and upon them, severally, he writes down or registers, in succession, the assigned numbers or letters answering to the several tinted yarns required, in their order, to form the tufts in the breadth of pattern in each lash.

The creel-table being furnished with yarns in the way described, a rack-frame, of a peculiar construction, is placed thereon. In Plate XV., this frame is represented in plan at fig. 1, and in transverse section at fig. 2. A, A, is a long bar, affixed to brackets B, B. Upon the upper side of this bar, extending its whole length, there is a rack or series of pins or studs inserted, a few of which only are shewn at C, C; and on the side of this rack a scale is placed, graduated with numbers, pointing out every tenth stud, which studs are intended to correspond with the number of tufts of yarn to be put into every lash of the weaving. A rectangular frame is attached to the brackets B, by joints; and upon this frame there is affixed a long bar E, E, which lies opposite and parallel to the bar A, and to the rack or series of studs C, C. In the outer edge of this bar F, there is inserted a series of open guides (a few of which only are shewn in the figure), corresponding in position and number with the studs of the rack-bar. These open guides G, G, are seen more perfectly represented, on an enlarged scale, in the auxiliary top view, fig. 3, and in front view at fig. 4.

The rack-frame, constructed as described, being brought and laid upon the creel-table, before mentioned, the operator proceeds to loop round the several studs, and the corresponding guides, lengths of yarn, selected in succession, according to the various colors and tints required for producing the series of tufts for one lash of weaving.

To do this the register cards are taken in their proper order of succession, on each of which has been written the letters or numbers of the series of consecutive yarns intended to be arranged for one lash of the carpet; and, agreeable to the instructions given in each card, the operator places round the respective studs C, and corresponding guides G, the several yarns, in looped lengths, beginning with the first stud and guide, and proceeding until the rack-frame is filled from beginning to end with looped lengths of yarn, of the various colors and tints required for one lash.

The first frame being thus charged, it must be removed from the creel-table, and a second similar rack-frame filled in the same way with looped lengths of tinted yarn; and so on other similar frames must be filled, agreeable to the instructions written upon the successive cards; there being as many register cards, and as many rack-frames to be filled with looped yarns, as there are lashes required to complete the entire length of the pattern or design to be woven. These rack-frames, thus filled with the looped lengths of tinted yarns, are then taken in succession, and severally placed in a machine for the purpose of drawing the lengths of yarn from the rack-frame into peculiarly-formed combs, preparatory to their being introduced into the loom.

This machine, with its peculiarly-formed combs, is represented at figs. 5, 6, and 7. Fig. 5, being an end view of the machine; fig. 6, a top horizontal view of the same; and fig. 7, a section, taken vertically in the direction of fig. 5, a few inches within the sliding-frame (hereafter described), for the purpose of shewing the situations of the combs more perfectly.

Upon a wooden table *a, a, a,* are firmly fixed the standards and braces of iron *b, b,* that support the stationary and moving parts of the machine. A horizontal shaft *c,* mounted in the standards, extends across the machine from side to side. On this shaft there are two pinions *d, d,* and at the other end a hand-wheel *e,* for the purpose of enabling the operator to turn the shaft. These pinions *d, d,* take into two rack-bars *f, f,* affixed to the side rails of a rectangular sliding-frame or carriage *g, g, g*; consequently, by the rotation of the shaft *c,* and pinions *d, d,* the carriage *g,* is moved to and fro longitudinally, sliding by means of horizontal guide-rods *h, h,* which pass through the standards, as seen in figs. 6, and 7. In the vertical connecting plates of the standards, best seen in the last-mentioned figures, there are notches formed to receive the ends of the comb-bars *i, i, i,* eight of which distinct comb-bars are shewn hanging in the notches in figs. 6, and 7. The construction of these comb-bars being of main importance, one of them is represented detached, on an enlarged scale, at figs. 8, and 9; fig. 8, being an end view, and fig. 9, a front view of a portion of one of the comb-bars. The bar is formed of metal at *i, i, i,* having a strengthening back of wood for the convenience of lightness, and of being readily handled by the operator. To the upper side of the bar the combs *j, j, j,* (formed of bent tin or other thin metallic plate) are attached in erect positions, by solder or other means. The several combs are placed in each bar, at a little distance apart, just sufficient for allowing of the warp threads of the loom to be passed between them, as will be hereafter described; the series of combs extending the whole length of the bar (though only a few are shewn in fig. 6,); and they must exactly correspond in guage or position and number, with the series of open guides and studs of the rack-frame mentioned before in reference to figs. 1, and 2. At the top of each of these combs there is an eye formed, which eyes are intended severally to receive the lengths of yarn previously looped upon the studs and guides in the rack-frame.

Any suitable number (eight are proposed) of these comb-bars *i*, with their series of combs *j*, all formed exactly alike, being placed across the machine, supported by the standards, as shewn in figs. 6, and 7, (the eyes of the combs in the several comb-bars being all perfectly in coincidence) they are held steadily in the standards by screwing down upon their ends a clamp, as represented at *k*, in figs. 5, and 6, where they are seen in their situations, ready to receive the lengths of yarn, which are to be drawn into the eyes of the combs by hooks or needles *l*, from the rack-frame charged with the selected yarns, as already explained.

The means by which the lengths of yarn are drawn from the rack-frame into the combs, are as follows:—To the back or left-hand bar of the sliding-frame *g*, *g*, (see figs. 6, and 7,) a series of hook-ended needles *l*, *l*, *l*, are made fast by being set into a notched-bar *m*, and confined by a clamp-bar *n*, above. These needles must correspond in number and coincide in position with the eyes of the combs *j*, into which they are guided by passing through slits in a bar *p*, fixed against the standards *b*, *b*, as shewn best in fig. 7.

The rectangular frame *g*, *g*, which may now be called the needle-carriage, moves to and fro, as before described, by its horizontal rods *h*, *h*, sliding through apertures in the standards *b*, *b*. This carriage being brought forward into the situation shewn at figs. 5, and 6, (the long series of needles extending over the whole breadth of the machine) will be all passed through their corresponding eyes in the series of combs *j*, extending along the several comb-bars *i*; and the hooks at the ends of the needles will then stand protruding beyond the last range of combs, as at *q*, *q*, *q*, in figs. 5, and 6.

The hooked ends of the needles having been thus brought through the combs, the rack-frame, filled with the selected yarns, as first described at figs. 1, and 2, is then brought and placed accurately in the machine, as shewn at figs. 5, and 6; its bracket-arms B, B, fitting firmly into notches cut in the front rail of the sliding carriage *g*. By these means the looped ends of the lengths of yarn passed round the several open guides G, in the rack-frame, will be all brought exactly over the corresponding hooks at the ends of the several needles protruding through the combs. The rack-frame D, with its row of guides G, (as represented by dots in fig. 5), must now be allowed to fall on its hinge-joints into the inclined situation shewn in fig. 5; by which means, the hooked ends of the stationary needles, as the open guides descend, will severally catch the ends of the looped yarns, and draw them off the guides as the rack-frame passes down to the inclined position; the reverse ends of the loops of yarn still remaining attached to the stationary rack or studs C.

The series of selected yarns being now all connected to the hooks of the needles, a backward movement of the sliding carriage to the situation, shewn by dots in fig. 5, will cause the needles to draw all the lengths of looped yarn from the rack-frame, through the eyes of the several series of combs, (as seen in fig. 7,) where they are to remain, ready to be transferred to the loom.

The combs of all the eight comb-bars, having been thus filled, the operator cuts through all the yarns crossways of the machine, by means of scissors, shears, or other cutting instruments passed along and between the edges of the several comb-bars; by which means, the combs of the several (eight) bars will all contain short lengths of selected yarns; each comb being properly charged to form the row of tufts for one of the corresponding lash, in eight separate looms, all weaving the same pattern.

These comb-bars are now severally taken to the respective looms, for the purpose of introducing the tufts of yarn into the fabrics; the different comb-bars, charged with yarns answering to the several lashes, being brought to the loom in succession, as the process of weaving goes on.

A side elevation of a carpet loom, of the ordinary construction, (is shewn at fig. 10,) in which a vibrating lever-frame or crutch *r*, is mounted, working upon centres fixed in the side frames of the loom, at *s*. In the upper part of this vibrating crutch-lever, sockets are formed at *t*, into which the cylindrical ends of the comb bars *i*, are to be introduced, for the purpose of conducting the tufts of yarn in the combs into the warp-threads of the loom. The vibrating crutch-lever, carrying the comb-bar, is first raised into the situation shewn at w, in fig. 10, the sheds of the warp being open. The comb-bar *i*, is then inverted by the hand of the weaver, and the warp threads of the upper shed caused to pass into the spaces (seen in fig. 9,) between the combs. A long needle, carrying a suitable thread of weft, is then passed through the transverse openings (seen in fig. 8,) in the range of combs under the shed of warp, as shewn at *x*, in fig. 10. The vibrating crutch-frame, with the comb-bar, is then brought forward to the situation shewn by dots at *y*, and the sheds of warp changed by the weaver in the ordinary way; by which the middle parts of all the small lengths of yarn in the eyes of the combs become bound into the warps. A shoot of suitable weft thread is then thrown between the warps by a shuttle, when the slay, on being brought forward smartly so as to strike against the upper part of the crutch-frame, will knock the crutch-frame away with the comb-bar; when the comb-bar in tumbling over, (to the situation shewn by dots at *z*,) will have withdrawn the combs from the short lengths of yarn, previously held in their eyes, and leave those yarns as small tufts inserted into the face of the fabric. A further shoot or shoots of suitable weft thread, may then be thrown between the sheds of warp, and on beating up hard, the tufts are securely fastened into the fabric, which finishes one lash. It is scarcely necessary to say, that all the following lashes of the weaving are to be performed in the same way, until by a succession of lashes, having the properly selected tufts of tinted or colored yarns in each, the piled pattern is completed upon the face of the fabric. As the ends of the short pieces of yarn, thus introduced as tufts, may stand up at irregular heights on the surface of the carpet or other fabric when woven, it may be necessary to crop the face of the pile, so as to reduce it to a level surface; this may be done by any of the ordinary means or machinery used for shearing piled goods; when the work will be complete, and exactly correspond with the Berlin or other design first provided.

The patentee claims, Firstly,—the method described of selecting variously tinted or colored yarns of worsted or other suitable material for the manufacture of ornamental piled fabrics; and arranging such yarns in racks or frames, so that they shall severally correspond with the various tints or colors required for forming the tufts in the weaving of the several lashes or weft lines of a given design. Secondly,—the peculiar construction of rack-frame described, with its open guides corresponding to the studs or rack, around which the lengths of yarn are looped. Thirdly,—the comb-bars and combs in which the short lengths of selected yarn are held, and transferred to the loom. Fourthly,—the machine carrying the hooks or needles, by which the yarns are drawn from the rack-frame into the eyes of the combs. And, Fifthly,—the means by which the short lengths of yarn are introduced into the loom and brought up to produce tufts of pile.—[*Inrolled in the Petty Bag Office, July,* 1846.]

Specification drawn by Messrs. Newton and Son.

Scientific Notices.

CORDES' AND LOCKE'S ROTARY ENGINE.

Owing to the number of failures to produce a practically useful rotary engine capable of competing with ordinary reciprocating engines, an effective and economical steam-engine for local and transitive purposes has generally been considered by practical engineers as unattainable, if constructed on the rotary principle. Numerous plans have been devised (many of which are extremely ingenious) for obviating the objections entertained against rotary engines, but we are not aware of one which may be considered as applicable to all circumstances where driving power is required; although, by many direct action engines, a certain degree of success has been attained, where the improvement has been applied to engines of small capacity. The class of rotary engine which has been most universally condemned, is that which is worked by the force of high-pressure steam impinging upon the vanes of a wheel contained within a circular case,—for the lavish expenditure of steam required to drive the wheel at a high velocity, has more than counterbalanced what advantages might otherwise accrue from the construction and use of an inexpensive and simple machine. Having seen so many promising, and, according to the sanguine hopes of their respective inventors, highly successful plans, fail, when brought to a proper and practical test, it was not without some misgivings that, at the invitation of Messrs. Cordes and Co., we inspected a large working-engine, constructed upon a plan patented some time since by them, and worked by the impinging force of steam at a high pressure; but from a cursory examination of the engine, and the satisfactory results which it appeared to give, we think that some description of the engine will not be uninteresting to our readers.

The inventors, in the specification of their patent, describe the engine to consist of a revolving wheel, mounted in a cylindrical box or chamber, which is capable of being exhausted. This revolving wheel is impelled in a continuous circular motion, by the direct action of a current of steam entering into the said chamber, in the direction of a tangent, to the circumference of the wheel, and impinging against suitable vanes affixed to that circumference: the steam afterwards passes out from the box or chamber through a suitable eduction passage into a condensing apparatus, wherein it is condensed. The interior of the said box or chamber is thus kept exhausted, in order that the wheel may revolve with greater freedom, and also allow the current of steam to enter into the chamber and impinge on the said vanes with all the force and velocity due to steam rushing into an exhausted space.

The figures in Plate XVII., represent an end elevation, a longitudinal section, taken vertically, and a transverse vertical section, of the improved engine. *a, a,* is the axle of the revolving wheel *b,* which is somewhat similar to an overshot water-wheel or bucket-wheel. To the main axle *a,* of the wheel *b,* the inner ends of the spokes or arms are attached; and they radiate outwards, and are fastened at their outer ends to a rim or felloe, composed of a cylindrical hoop, and two flat circular rims, projecting outwards therefrom, and forming sides to the other rim, so as to form an annular groove all round the wheel. This annular groove, or the space between the side rims, is divided into compartments or buckets, by means of several vanes, which are fitted therein. The direction of the planes of the several vanes may be radial, or may be somewhat inclined to a radial line, as is shewn by the dotted lines in the central figure. The axle *a,* and spokes of the wheel may be made of wrought-iron, and the rim or felloe with its vanes, of copper. *c, c,* is the cast-iron box or chamber, wherein the wheel is enclosed; and it is supported on two standards, as seen in the figures, so as to be immoveable. The wheel is keyed to its axle *a,* and revolves within the box *c,* without touching at any part. *d,* is an induction steam-pipe, furnished with a throttle-valve *e,* and conveying steam from any suitable boiler to the engine, which it enters through an aperture, cut diagonally in the box *c.* Steam, thus supplied, impinges upon the vanes of the wheel in the direction of a tangent to the rim. *f,* is the exhausting passage, connecting the box *c,* with the condenser *g,* which is immersed in the cold water of the cistern *i,* supported on brick-work. *k, k, k,* are three pumps combined together (in the manner of a three-barrelled force-pump, with solid pistons), in order to act in succession, as a continual air-pump, for exhausting and keeping the condenser *g,* exhausted.

A wheel, of any suitable kind, is fastened on one end of the axle *a,* for the purpose of communicating motion to any machinery which the engine is required to drive; and on the other end of the axle *a,* a small pinion is fixed to turn a spur-wheel, which is fastened on the lower end of the governor. The triple crank which actuates the solid pistons of the three pump barrels, *k, k, k,* may be worked by the axle *a,* of the wheel *o,* by suitable crank-rods and guides, in the usual manner of working a three-barrelled forcing-pump, of that kind which has its barrels open at top, and solid pistons;—but, for marine purposes, it is preferable to have a small auxiliary engine to effect this object; although, for stationary engines, where a few minutes time lost in starting is not an object, the engine itself will work its own pumps.

The mode of working the engine is as follows:—The steam to work it is conveyed through the pipe *d,* to the throttle-valve *e,* from an ordinary steam-boiler; or, in some cases, *d,* may be part of the eduction pipe of an ordinary condensing steam-engine, which eduction pipe conveys the waste steam away from the cylinder of that engine to its condenser. Or, in other cases, *d,* may be part of the eduction pipe of a common high-pressure engine, which usually blows away its waste steam through that eduction pipe into the open air; but in either of the two latter cases, the pipe *d,* will conduct such waste steam into the engine, in order to work the same; and, as it rushes with force and rapidity into the space within the box *c,* it will impinge directly upon the vanes, at the circumference of the revolving wheel, and turn that wheel round; but, at first, it will only be turned slowly, because of the air wherewith the box *c*, is at first filled; but the entrance of the steam therein drives out part of that air through the condenser *g*, and through the discharge valves of the air-pumps *k*, *k*, *k*, or else through what is termed a blow valve, if the condenser *k*, is provided with such a valve, as is often the case in condensing steam-engines; and, by degrees, as the motion of the wheel sets the air-pumps to work, they soon draw out all the remaining air. The steam then entering with great force and velocity into the exhausted space within the box *e*, impinges violently against those vanes of the revolving wheel which are opposite to the entrance aperture in the case, and by acting in a direction nearly tangential to the rim of the wheel this latter will be turned round with great rapidity and force. If, however, the auxiliary engine, beforementioned, be employed to exhaust the case or box *c*, the wheel may be set in rapid rotation instantly. The sides and circumference of the rim of the wheel are adapted to that portion of the interior of the box *c*, which is between the entrance passage and the eduction pipe *f*; so that the wheel is caused to work as nearly in vacuo as is required for the purpose of rendering its motion very free and unresisted, except by the work that the engine is appointed to perform; the degree of exhaustion kept up within the box *c*, indicating the most favorable working condition of the engine.

The patentees conclude their specification by stating that the distinguishing character of their improved engine is—a revolving-wheel, enclosed within an exhausted box or case, and impelled and turned rapidly round by a continual current of steam entering with force and velocity into the exhausted space wherein the wheel is situated, and impinging against suitable vanes, at the circumference of such wheel in the direction of a tangent to that circumference;—the said box being connected by an eduction pipe with a condenser, which is kept cool by means of cold water, so as to exhaust the steam from the box at that part of the circumference of the said box where the steam ceases to act against the vanes; and that condenser having an air-pump capable of continual action, in order to keep up the exhaustion within the condenser.

Engines of apparently similar construction to that above described, have been before tried, but have never given any practically good results, owing to the great consumption of steam; it has, therefore, remained for the present inventors to suggest a remedy for this fatal objection. It is not, at present, our intention to offer any opinion as to the utility or advantage of Messrs. Cordes' new-engine, as we have not personally tested its powers; but if continuous working upon an extensive scale, for many months, without any substantial repairs, is any criterion of having successfully overcome the various obstacles to which others have been obliged to yield, this engine may be considered to have so far succeeded. We are informed that Mr. Parkes, C.E., has been for many weeks watching the operation of the engine, and has drawn up an elaborate and most favorable report of its performances, which the inventors intend laying before the Society of Arts, in the ensuing session, for discussion: we may therefore, at a future time, return to the subject, and present our readers with some of Mr. Parkes' remarks and experiments.

THE GRANTING OF LETTERS PATENT EXEMPLIFIED.

In a country like Great Britain, which has risen to wealth and eminence, form the constant progression exhibited in all branches of the manufactures, it would be unreasonable to deny every facility, which prudence might dictate, for advancing the interests of the ingenious inventor. Under such a feeling, doubtless it was, that the far-seeing "good King James," when crippled by Parliament in exerting his royal prerogative, reserved to himself the right of protecting inventors in seeking out a reward for their own ingenuity; and *custom*, which is our great arbitrator in all matters of law, has carefully preserved, even to the present time, the privilege of allowing the ingenious (after they have handsomely paid for it) to enjoy for a term the benefits of their persevering industry. In many foreign countries, as is well known, similar privileges exist; but no patent can be obtained without, at the time of application, stating what branch of the arts the inventor contemplates improving. No doubt some of our readers may be ready to assert, that a similar practice is enforced in this kingdom; and perhaps, if speaking of former days, there would be grounds for supposing them in the right; but, whether from the enlightenment of the times, and the consequent development of liberal ideas, or from the evidently increasing faculties for invention in the human mind, we know not, "the powers that be" have apparently considered it too crippling a measure to demand from an inventor, when applying for a patent, a clear statement of the subject to which his improvement refers. His declaration, "that the invention will be of general benefit and advantage," is sufficient guarantee for his good intentions towards the public; and his readiness in providing funds to carry the patent to the Great Seal, is further proof, if such were wanting, of the confidence he places in its ultimate utility.

Like all reforms, this liberal mode of exercising the royal prerogative has come upon us slowly, and is now beginning to exhibit its full growth. The advantages to the patentee are evidently great; for, like the criminal, who is his own judge and jury, he can arrange matters to his perfect satisfaction. He may now (if precedent is to be relied on) obtain a patent under a title, which means any thing he pleases, or nothing in particular; and, when he has thus far succeeded, his imagination (to say nothing of his eyes and ears) is allowed to wander unfettered through the various branches of the arts, until, laden with treasures collected in a six months' flight, it unburdens itself in prosy parchment, which is consigned to the keeping of the Master of the Rolls.

It would appear disloyal, were we to question the power of the Crown to grant such patents, which contain nothing definite, except that their existence is limited to fourteen years' duration; and it might be thought invidious in singling out from the many a *nonsense title* (for such we may term this species of modern creations), which has been most lucidly explained by the patentee in his enrolled specification; yet, for the good of the "discerning public," we think it our duty no longer to remain silent. For our own part, we are not of that class whose unsophisticated minds prevent them tracing the strong resemblance between a fire-shovel and a nutmeg-grater; but we must confess to being surprised, when lately sitting down soberly to examine the specification of a patent for improvements in ventilating, we found it to be a new construction of furnace. This would not, however, alone have drawn forth a word of comment, had it not been our lot to see the specification of a patent, which, for the pleasing varieties it contains, may be considered one of the greatest curiosities on the Record. The patentee is a Mr. Charles Smith, of Newcastle-street; and the title under which his ingenuity has developed itself, is—"improvements in cooking and culinary utensils; and methods of heating and suspending, or fastening articles of domestic use, and similar purposes." It is not our intention to analyze this title, and prove, that *suspending* and *fastening* are not synonymous; for it is evidently not intended for ordinary mortals to comprehend; the suspending or fastening of *purposes,* being decidedly a poetic flight, and, unfortunately, not sufficiently dwelt upon, in his specification, to give a clear idea of his meaning. The following are the heads of Mr. Smith's invention, which, for variety, may fairly challenge the resources of any marine store.

This invention is divided under eleven heads, as follows:—

1. Improvements in manufacturing fuel; in machinery for moulding the same, which is also applicable for moulding plastic goods generally; and in manufacturing cements or compositions, for mixing with and combining, or solidifying the fuel, which are also applicable for building and other purposes. Some kinds of the fuel are prepared in small masses, and used for heating kettles, coffee-pots, and other vessels, by being placed in the lower part of the same.

2. Under this head are included improvements in the construction of coffee and tea-pots, or urn kettles, or similar utensils, and the modes of forming them, in two parts, and attaching and detaching the parts from each other, so that the water in the boiler part is forced by the pressure of the steam into and through a perforated vessel, containing tea, coffee, or similar matters, into the pot or urn; also, constructing such boiler part, so that it may be readily heated on ordinary fires, or by an iron heater or lamp on a stand; also, making tea or coffee-pots or urns in earthenware, with a perforated straining vessel suspended therein, and methods of applying stands, &c., lamps or heaters, to such and similar vessels, formed of like materials: also, forming frying-pans, kettles, saucepans, and such like vessels, with flues around them, and occasionally with copper bottoms applied thereon to those formed of tin, as well as to other similar tin vesssels; and methods of heating pots and similar vessels on stands or envelopes, with or without flues around them, so as to facilitate their boiling properties, and tending to preserve and keep them clear.

3. This head relates to portable ovens or similar apparatus, to be heated over an ordinary fire, for baking, and to methods of applying hermetically secured covers to those and similar articles; also to a portable apparatus for baking, boiling, or cooking with steam at the same time, over an ordinary fire; also, a method of roasting coffee; also, methods of toasting, boiling, or roasting, and readily turning any small matters before ordiary fires.

4. Relates to the application of a heater, of hot water, or other fluids, to culinary articles; also, modes of hermetically securing all kinds of culinary, domestic, chemical, or similar vessels or articles; also, the combination of a slop pail, night stool, wash-hand-stand, and jug, with the vessels to contain the soap, &c., and a pole or horse, to receive the towel, in one apparatus hermetically secured; or two or more of the parts can be used separately; also, an earthenware chamber receptacle, hermetically secured; also, the application of castors, handles, and brackets to tubs, buckets, pails, or similar vessels; also, the application of a groove and hermetically securing joint, to the heads of casks, boxes, canisters, or any other suitable articles; also, methods of forming vessels to receive knife or fork rests; also, the formation and use of figures for such purposes.

5. This head consists of improvements in fenders and fire-places, so as more effectually to serve the double purpose of a fender and fire-guard; also, improvements in fire-irons, coal-scuttles, trays, or baskets, and similar articles; also in ash-boxes, in fire-grates, with a revolving perforated cover or sifter, and flanges for fenders; also, improved subatitutes for the Italian iron, or frill-setter, &c., to be heated by an iron heater, with or without hot liquor; and the heating on similar stands and heaters tea, coffee, or shaving pots, egg roasters or boilers, and such like

vessels; also, the method of mounting box-irons or similar articles on rollers, for ironing, or to serve the purpose of mangling, &c.

6. This part of the invention refers to the application of heat for dissolving tallow or concrete oils, keeping them fluid, so as to burn in any lamps of suitable form; also, methods of forming durable wicks, with a number of capillary tubes through them, so as to continually supply the upper end or burner part thereof with the above or any inflammable liquid; also, filling metal tubes or other cases with porous absorbing matters to serve similar purposes; and the use of tubes filled with porous matters, or tubes of porous materials for the purpose of lubricating; and modes of admitting air to floating burner lamps; also, making earthenware candlesticks, with match-boxes, and with or without rough surface covers, to give friction thereto; also, pressing or consolidating candles.

7. Filtering water or other like fluids; also forming absorbing articles or surfaces with slices of sponge, or the same material in a comminuted state; also, lining iron pipes with earthenware or glass tubes, and the application of enamel to the inner surface of iron pipes, to prevent oxidation; also, methods of forming stench-traps, to prevent the foul air rising from sculleries and other domestic drains or pipes.

8. Forming double-cased warming-pans, so that they can be applied to roasting potatoes as well as warming beds; also improved modes of making portable feet-warmers, and combining a brazier, umbrella-stand, and clothes-horse, in the same article, and occasionally applying heat to the same; and forming a brazier and plate-warmer in one article, to be heated by a heater, or so that the parts can be heated in like manner, and used as separate articles for those purposes.

9. This division relates to the formation and application of articles or vessels to be placed on the feet, or on the boots or shoes, or otherwise, for containing suitable hot matters for warming the feet; and the application of sockets formed in walking-sticks, whips, and umbrellas, or the handles of other articles or tools, for the purpose of containing hot comminuted or solid pumice stone or other suitable matters, or hot liquids; and the occupation of such tubes or spaces, formed in any such articles, with wine or liquors, or to contain cigars, or match or snuff-box, and the occasional application of a looking-glass in the cover, or some other convenient part thereof; and the making cigar cases containing a match-box or snuff-box, rough surface, and looking-glass, or any two of them, in one article or case; and modes of making cigar-trays, with compartments for containing separately the cigars, liquids, and rough surfaces; and the application of close covers to bread or cheese trays or bowls; also modes of forming sandwich-boxes with additional compartments for containing liquor, cigars, matches, rough surface for ditto, or looking-glass, or any two of them, or for other purposes; and modes

of making similar metal or other formed cases, to contain paper or books, with or without locks or easel-rods thereto; and "cliffs" for holding books and papers; and apparatus and modes of making easels for holding and suspending similar articles, in any suitable or convenient position.

10. This head relates to articles for making, pulverizing, or grinding vegetable matters in a moist or dry state; and the application or combination of a fork, spoon, or scoop, or ladle in one article,—also forming a knife and fork cleaner in one portable article, or in the use of the parts in two articles;—forming hinges, so as to simultaneously lift and suspend doors with their opening, and at their closing to fit closely to the floor; and combining a door-plate, two knobs, and alarum bell suspended, and knocker thereof, so as to operate in one article.

11. Forming wood poles, or metal tubes, with a longitudinal slot, the whole length thereof, for balls or buttons, with shanks, hooks and eyes, or rings, formed thereto, to slide freely therein, whereby articles or fabrics may be suspended; and to answer all the purposes of curtain rods, rollers for blinds, or any similar or other suitable purposes;—making round or angle-formed plates in two parts, and fixing them at a distance from each other, to the under surface of a beam, or any suitable article, to serve the above purposes; or for a path or railway for friction-rollers or wheels, or axles, or frames to pass in, and to carry an apparatus thereto, for suspending, carrying, or removing articles or goods of all kinds; and the modes of suspending a box or covered case to carpet bags, reticules, or similar utensils, with or without locks;—also, forming, sewing, or otherwise fastening, a metal pan or bottom to the lower parts of carpet-bags, and to nose-bags for horses, sacks, or other bags, or similar articles, so as to form substantial bottoms thereto; also, modes of fastening stays; modes of forming metal button-holes, and button or hook and eye-fastenings, the hook and eye, when attached, forming an ornamental design.

ON THE MEANS OF ENSURING SAFETY ON RAILWAYS,—BEING A REPORT MADE TO THE MINISTER OF PUBLIC WORKS, BY M. DE BOUREUILLE, HEAD OF THE RAILWAY DEPARTMENT.

[Translated for the London Journal, from the "Bulletin de la Société d'Industrie."]

The Special Commission, charged by the Minister of Public Works to enquire into the questions relating to the security of transit upon railways, has, from the first, had two subjects of very different natures to consider. The catastrophe of the 8th May, 1842, had called public attention most particularly to the construction of axles of locomotive engines and carriages, and to the terrible consequences of the shocks to which passenger-trains might be exposed upon railways. From that time a great number of inventors occupied themselves in endeavouring to improve the construction of axles and diminish the effect of concussions;

and their various plans the Commission has had to examine. The greater number of these inventions are not of a nature to be usefully applied to railways; but they nevertheless furnish a signal proof of that interest for the public good which everywhere exists in France, and leads even the inexperienced to suggest means for preventing the various accidents which so frequently occur.

Some of these plans, having for their object the prevention of a certain class of accidents, would, if adopted, inevitably end in causing other accidents, perhaps of a more serious nature. Others, again, based upon a sound principle, on being carried out did not answer the expectations of the inventors. In a word, a very small number appeared to be suitable for immediate application, but were merely the result of experiments made on a small scale.

It must, besides, be observed, that whenever a violent shock is sustained, it will always be difficult to prevent a serious accident. The Commission, therefore, while acknowledging the probable utility of certain measures of precaution, does not hesitate to declare, that the result desired is not so much to lessen the effect of the shock, as to prevent any shock from taking place; and it is with this view that the questions which have arisen upon the subject of the security of railway transit have been considered.

The safety of railway transit may depend on various circumstances; 1st,—On the state of the road or way, and the mode of its construction; 2ndly,—On the state of the materials employed, viz., the engines and carriages, and the different parts of which they are composed, viz., the wheels, axles, springs, &c.; 3rdly,—On the formation of the trains—that is to say, the mode of attaching the engines and carriages together, the kind of brake employed, the methods of deadening shocks, &c.; 4thly,—On the regulations to be observed when the trains are running, the speed at which they are to travel, the signals and means of communication established, either between the engine-drivers, or between them and the officials at the stations or on the road; 5thly and lastly,—On the degree of intelligence employed in the service, and the ability and characters of the persons employed.

The Commission has successively discussed each of the subjects contained in these several categories, and has in each case inquired into the fact, whether the precautions now taken are sufficient to ensure the security of passengers, and consequently whether it be necessary, in certain cases, to propose any new arrangements.—

I. *Of the Railway and its Accessaries, such as Crossings and Changes in the direction of the Road.*

It will be unnecessary here to recapitulate the various plans which have been successively employed for the construction of railways: it will be sufficient to observe that the method now generally adopted in France consists in fixing the rails by means of wooden chairs placed in cast iron bearings, which are fixed two together upon wooden sleepers, placed at equal distances apart: the number of sleepers varies according to the nature of the soil upon which the road is to be formed, the weight of the rails, &c. The sleepers are covered with sand to keep them in their proper position.

Some engineers, in order to render the rails more firm, and to prevent their bending between the transverse sleepers, have proposed to lay the rails upon longitudinal sleepers. The line of rail from London to Bristol is laid down in this manner; but it is not apparent that this plan has been much followed in France.

It must not be forgotten, however, that the plan generally preferred by French engineers appears still to be open to criticism, as regards safety. It will be easily understood, that the principal end desired to be obtained in this respect, is to keep the rails of each line as nearly as possible at the same level, and, also to keep the rails of each line parallel. If these conditions are not attended to, or if, by a faulty arrangement of the line, the rails are depressed at certain points, keeping their original level at all the others, the wheels of the engines and carriages will oscillate in such a manner as to render them liable to be thrown off the rails, and thereby cause some serious accident; also, if the two lines of rail are not maintained at the same distance throughout, the result will be, that the axles of the engines and carriages will be more or less twisted, by which they might be broken and the wheels thrown off the rails.

The Commission had therefore to enquire, on the one hand, whether this method of constructing railways was sufficient to maintain the rails at the required distance. This was answered affirmatively, adding, however, that it would be advisable to place the sleepers nearer together at the junction of two lines of rail, than at the intermediate points.

As a corollary to this question, the Commission thought proper to enquire whether the breadth between the rails most commonly adopted, viz., 4 ft. 8 inches, was sufficient, and whether it would not be advisable to increase it.

On the first point, the answer in the affirmative was given without hesitation; and, as to the width of road, the Commission was of opinion, that the guage at present in use might be continued; adding, however, that it would be advisable to keep it in tunnels, and between the parapets of works, the same as on levels and in cuttings.

With regard to any alterations to be made in the position and form of the road, the Commission declares, that the depression or elevation of the rails, a defect in fixing them in the chairs, derangement of the sleepers supporting them, inequality in the sand forming the foundation of the road, or too thin a layer of this sand, must be considered as very likely causes for the carriages getting off the rails.—They must, therefore, be prevented by every possible means, and the road must be examined with the greatest care, not only at the time of its opening, but also frequently during working.

The Commission mentions two other causes of the rails getting out of order, which seem to be quite as dangerous:—First, the displacement of the rails in a longitudinal direction, or direction of movement; and secondly, the uniform inclination of the sleepers supporting the chairs and the consequent displacement of the rails. These various causes of danger may be averted, or at least greatly modified, by a constant and attentive surveillance of the road.

The Commission had still to examine, on the one hand, whether the form adopted for the rails was the most suitable; and on the other hand, whether the test of the manufacture of the rails, before employing them, was sufficient to be relied upon.

On the first point, the Commission was to confine itself to a statement of the form which would most likely cause the carriages to run off the rails; and on this subject, it thought proper to remark, that by reason of the inclination generally given to the periphery of the wheels, it was necessary, in order to diminish the oscillation as much as possible, to give a certain curve to the surface of the rails.

As to the second head, it appeared to the Commission to be of much greater importance; for, if the rails are badly manufactured, or if the material is of inferior quality, they will be liable to break on the slightest shock; thereby subjecting the passengers in the train to great danger. It is, therefore, most desirable to pay particular attention to the manufacture of the rails, and to test them thoroughly before laying them down.

At the side of the main line are the sidings or switches, for changing the line, and also crossing on a level, which may, under certain circumstances, cause the train to run off the rails. These circumstances are fortunately of rare occurrence, and even when they do occur, they are mostly without danger. In fact, these crossings or changes of line are nearly always either at the stations or at the entrance to the stations. At these points, the speed is always considerably slackened, and, consequently, the risk of the train running off the rails is much lessened, and, if it happens at all, is rarely the cause of any very serious accidents. In some other cases, however, of less frequent occurrence, for instance, at the meeting of two roads, and where crossings are necessary, accidents may occur.

There are three different systems of switches employed upon railways; the first—that of moveable rails, which act by pressing upon the inside of the carriage wheels, so as to force them to run in the required direction. This plan possesses the disadvantage of loosening the wheels and wearing them away quickly. The second system is, that of the moveable rails, which may, by turning on a pivot, be moved in the direction in which the train is required to run. In this plan, there is no pressure on the inside of the wheels; but, if by chance, the moveable rail is badly placed, the engine will run off the rails. And, lastly, the third plan, which is generally adopted at present, is one that unites the advantages of the first two. It is composed of double switches, arranged in such a manner that there may be always a moveable rail opposite each road; and the switches being always brought back to their original position, by a counterbalance weight, there is no danger of running off the rails. This latter plan is much preferable, as regards public safety.

Independently of the changes and crossings in a level, the Commission has given its attention to some questions which are of great importance as regards security in travelling. For instance, when a railroad is carried across a deep valley, which can only be traversed by means of lofty viaducts, or through deep cuttings, or across rivers, of greater or less width, it will be understood that it would be much more dangerous to run off the rails at such places than when travelling on a level road, although attended at all times with much danger. In order to prevent this, as much as possible, counter-rails are generally employed, placed either inside or outside the line of rails, and more or less elevated above the ground. The Commission has thought, that in certain cases, the counter-rails may be useful, adding besides, that when used, it is advisable to place them inside the ordinary rails. In fact, by this means, the height of the flange of the wheels is gained; and, besides, if an axle were to break, the wheel, instead of being dragged outside the rails, would have a tendency to run inside, which is an evident advantage as regards safety.

Another point, no less important, on this head, consists in the means to be adopted in crossings on a level. Independently of the consideration of the accidents which may result from a defective arrangement of the rails, and counter-rails for protecting them, the manner in which the railway is to cross on a level, or in which the barriers for cutting off the communication between the two roads are to be established, is worthy of the attention of government.—In fact, if the railroad and common road cross at a very oblique angle, it will sometimes happen (and examples of this have been known on the Versailles Railway) that the common-road carriages will get upon the railroad and occasion serious accidents.

The Commission is of opinion that it is advisable to take the precautions necessary for causing the roads crossing the railway on a level, to run as nearly as possible at right angles to it.—It is also of opinion that it is necessary for public safety to construct the roads crossing on a level, so that they may be closed; but it will be advisable to provide for the occasional closing of the railway.

Lastly,—the Commission has had to examine whether, as regards safety of transit, there should not be a limit to the radius of the curves, and what this limit should be; but it was not long in perceiving that nothing positive could be decided on this point, and that it should be left to the government to determine, in each particular case, the limit to be adopted. This limit, as at present stated in the railway books, appears suitable and sufficient for preventing accidents.

II. *On the influence of the state of the materials, as regards safety of transit, and the precautions to be taken for that purpose.*

If the state of the rails, and the materials of which the railway is composed, have great influence upon the security of railway transit, the machinery employed in working it, viz.—the locomotive engines and carriages, is also worthy of serious attention.

It will, in fact, be readily conceived, that most serious accidents may be occasioned either by the breaking of an axle of an engine, or carriage, or of a spring, as it may cause the train to run off the rails; and it is well known that this is more to be feared than any other accident.

Another cause of trains going off the rails is, the oscillation of the trains when in progress.—This motion is most likely to be produced when the peripheries of the wheels are conical and run upon flat rails. The consequence of this is, that at one time the larger, and at other times the smaller diameters of the wheels, come in contact with the surface of the rail, and thus the oscillation is produced.

Experience has proved, that by forming the upper surface of the rails of a slightly convex form, the oscillation may be much diminished, and the friction of the flanges of the wheels upon the rails will be reduced in proportion. They are, in fact, scarcely in contact, and consequently, the rails may be made about a third of an inch wider, which greatly facilitates the progress upon curves. These slight improvements need not increase the expense of the railway, but by their adoption the chances of accidents will be greatly diminished.

The Commission has also thought fit to take into consideration the probable consequences of the breaking of a suspension spring, either of a locomotive engine or carriage; and the more so, as many persons have attributed the accident on the Paris and Versailles Railway to a cause of this nature. Without pretending that there is any foundation for this opinion, the Commission is bound to declare that the breaking of a spring might, in certain cases, cause the train to go off the rails: it appeared, besides, important for all the springs to be sufficiently stretched, and the weight of the load distributed through the springs.—The action of the springs keeps the wheels constantly in contact with the rails. The weight of the load will, therefore, increase the action of the springs; and if the weight of the load is not sufficient, it may happen that the springs will not produce the desired effect, and in that case, the carriage may be thrown off the rails. For the same reasons, the load must be equally distributed on the springs. Some persons, in order to lighten the accidents occurring from the breakage of carriages when violent shocks take place, proposed to have them constructed of stronger materials; but the Commission thinks proper to remark, that by that means danger of quite as serious a character is incurred, viz.—that of crushing the passengers against the sides of the carriages. The Commission thinks proper, with respect to carriages, to recommend the adoption of suitable padding at all those parts against which passengers might be injured.

These points having been settled, the next question to be discussed relates to the axles. This subject is one that has greatly occupied public attention, from most of the serious railway accidents having been accompanied, if not caused, by the breaking of an axle. The Commission has examined the axle, successively, in all possible positions:—first, in the process of manufacture, and in their form and adjustment; and, afterwards, in the different kinds of work to which they might be adapted. As regards the manufacture of axles, the Commission is of opinion, that this manufacture is now conducted on as perfect a plan as possible, as well for straight as cranked axles. The former are wrought by the hammer; and the cranked axles, which are always larger, are also made of fagotted iron; but in order to give them the desired form, only one method appears to have been thought worthy of being employed.—This method consists in putting a number of iron bars together to form a parcel of about two feet square; and these, having been heated in a reverberatory furnace, are submitted to the action of a powerful hammer, and beaten on all sides, in order to weld the bars together: the bar thus made, is afterwards reduced to a thickness somewhat more than the diameter of the intended axle, keeping a sufficient width for the cranked part. Those parts of the axle which are to receive the wheels, are first wrought into the required form, and then the cranks (which do not require to be rounded) are brought to their proper shape.

The form to be given to the axles is not material. It has been proved by experience that axles nearly always break inside the wheels, and at or near the nave. It is therefore advisable to make this part much thicker than the others; and this is generally done by manufacturers; but they do not always pay great attention to the levelling of these parts with the body of the axle, as the incline is generally too abrupt. This mode of manufacture being very defective, and likely to decrease the strength of the axle, it is indispensably necessary to make the thick parts taper gradually down to the smaller ones, or in the form of a truncated cone, the apex of which would be equal to the diameter of the body of the axle.

Only iron of first-rate quality must be used for making railway axles; and this iron must be very malleable, and tough; and must be analogous to the best quality of wrought iron made with charcoal.

The Commission had to enquire whether it was advisable, before employing the axles, to test their strength; and their opinion was, that this trial was not desirable, but that there might be certain modes of trial which would not injure the metal, and which would nevertheless expose the defects: such, for instance, as re-heating to a cherry red—an examination of the portions detached from the ends of the axles, &c.

In a word, the especial attention of the Companies should be called to this question, the importance of which may be easily understood; and they ought to be also obliged to keep registers, in which all the axles received should be carefully noted, together with all the circumstances of their reception, and a statement of the proofs to which they had been submitted.

When working on railways, the axles are subjected to strains of different kinds, and to shocks and vibrations, sometimes of a very violent nature, which may cause them to break. Accidents of this nature have frequently happened upon railways; but, in most instances, the circumstances have not been truly investigated, nor the appearance of the fracture considered; except in some cases (fortunately very few) in which the breaking of the axles occasioned serious injury or death. But in these cases, the two broken portions of the axle had been so twisted, that no conclusion could be arrived at from the appearance of the fracture. It is, besides, generally impossible to determine whether the breaking of the axle was the cause of the accident, or merely the effect.

From these circumstances, the Commission has been unable to discover any documents of a nature sufficiently conclusive to determine the probable time that axles would last; but it has no hesitation in declaring that they are deteriorated in quality by use. It may be concluded, from isolated but well-verified facts, that, after a certain time, depending upon the effective work accomplished by each, the axles will break.—Is this owing to any molecular change in the material? It is impossible to determine this from what we know at present; but it will be readily conceived that this is matter of serious consideration, and, consequently, the Commission thinks that every Company ought to be obliged to keep a register, in which should be entered, independently of the particulars of the time of receiving the axles, &c., the number of miles run over by each.

The documents extracted from these registers would doubtless be of great utility for solving the important questions relative to the duration of axles; but the fact cannot be denied that this will furnish no result until after a number of years; and, therefore, the Commission is of opinion that it would be advisable to make some experiments as to the means of ascertaining, at any time, the amount of alteration which has taken place in the axles; and either to restore them to their former state, or limit the period of their working.

After ascertaining the average weight which axles have to support, and the strain they undergo, the following experiments were proposed to be made:—On analysing the strain upon axles, it was found to consist, 1st,—Of a vertical strain, due either to that portion of the weight of the engine bearing upon that point, in consequence of the position of the centre of gravity, or to the action of the springs of the hinder axle in the six-wheel engines. This strain being thus defined, even supposing that the parts upon which it acts are as near as possible to the *point d'appui* formed by the wheels, tends, nevertheless, to bend the axle in a vertical direction.

2nd.—A twist or strain, arising from the conoidal form of the peripheries of the wheels, and inequality in the inclination of the rails; from which it happens that the peripheries of two wheels, fixed upon one axle, never touch the rails at the same part at the same time, and consequently, each of the wheels slip alternately on the rail: if the twist resulting therefrom is not too violent, it keeps all the molecules in a permanent state of vibration.

3rd.—The shocks arising from inequalities in the road, caused by the undulations of the rails, and the momentary depression of the rails at their point of junction when a train passes. These shocks increase in violence in proportion to the speed of the train, and act in a direction at right angles to the axis of the axle.

4th.—Another kind of shock, arising from the oscillation of the train, which acts on the axles both in the direction of their length and at right angles thereto, increasing in force in proportion to the diameter of the wheels on the axles.

In order to appreciate the effects of these four kinds of strain, the Commission is of opinion, that the first series of experiments to be undertaken, should be to inspect a certain number of axles which have already worked for a given time upon railways, and minutely examine their interior texture. As, however, these experiments could not lead to perfectly satisfactory conclusions, from the want of points of comparison, the Commission is of opinion that it would be advisable, at the same time, to commence experiments upon axles.

These experiments might be made by taking an ordinary locomotive axle, furnished with the two wheels, loading it as it would be if adapted to an engine, and giving to it a rotary movement, similar to that which it would acquire if employed upon a railway. By placing the wheels of this axle upon a frame, consisting of another axle, furnished with wheels, to which motion is communicated by a steam engine, the first class of action to be observed will be obtained.

All the other motions might be obtained by this means; and also, by a suitable construction of the wheels of the frame, the twisting of the axles, the shocks arising from the bending of the rails, and the shocks arising from the oscillation. By this method of proceeding, the axle submitted to experiment will be exposed as nearly as possible to the same injurious action as when in use; only, instead of advancing upon a railway, the railway will present itself to the wheels. The Commission, wishing to ascertain the expense of the above experiments, arrived at the following results:—

It will be understood, that the apparatus used for trying the experiments must be made of pretty large proportions, and all the parts must be sufficiently strong to resist the action, the effects of which it is intended to prove.

The details of this apparatus must be carefully attended to; but the expense cannot be estimated at less than from £400 to £500. In order that the experiments may lead to results worthy of interest, it will be necessary to try, comparatively, axles of at least three different diameters, and to act upon two axles of each kind, in all six axles, furnished with their wheels, the expense of which will be about £90.

Lastly.—The working of the apparatus will require a certain amount of power, constant attention, and the renewal or repair of some parts of the mechanism, such as the brass bearings for the axles, or the tyres of the wheels.

In conclusion, the Commission is of opinion that, in order to make experiments in a suitable manner, an outlay of at least £800 will be required. It is evident that these experiments will occupy a considerable time; but this does not appear to be a sufficient reason for abandoning them.

(To be continued.)

LIST OF REGISTRATIONS EFFECTED UNDER THE ACT FOR PROTECTING NEW AND ORIGINAL DESIGNS FOR ARTICLES OF UTILITY.

1846.

Oct. 29. *John Moore*, of Birmingham, gold pencil manufacturer, for an optical pencil.

29. *John Saywell*, of Gough-street, Gray's Inn Lane, Middlesex, joiner, for a carriage window sash.

29. *Joseph Lake*, of the Borough-road, for a bedstead.

30. *Loach & Clarke*, of Birmingham, for a lock spindle.

Nov. 4. *William Binnion*, of Birmingham, for a roof-lamp for railway and other carriages.

4. *Rowan & Co.*, of Atlas Works, East Milton-street, Glasgow, for an improved railway wheel.

11. *Michael & Abraham Keyzor*, of 24, Castle Mead, Norwich, for double spectacles.

Nov. 11. *Tristram Walker Blades*, of Richmond, Yorkshire, for a chimney cowl.

12. *John Robison*, of 2, Gresham-street, Wood-street, City, for the Nonpareil shirt.

14. *Frederick Stray*, of 39, Haymarket, London, for a pair of trowsers.

20. *Edward Pillbeam Cox*, of Lenton, Nottinghamshire, bobbin and carriage maker, for a bobbin carriage for lace machines.

21. *Joseph Scates*, of 40, Frith-street, Soho-square, for an improved lever action, with cylindrical fulcrum, for the concertina, accordion, harmonicon, melephon, and seraphine.

21. *Edward Goodwin*, of Wolverhampton, for an improved fastening for harness.

21. *John Riley*, of Pothoure Bridge, Bilston, for a machine for straightening and cutting wire, or making small rounds.

24. *Henry Todd*, of Brompton-road, artist, for a flame-feeder.

24. *Vincent Price*, of 33, Wardour-street, Soho, for a self-rotating mincing or chopping machine.

24. *James Brown*, of Birmingham, for a candlestick and match-box, combined.

24. *William Messenger*, of Russell-row, Birmingham, for an improved drawn-metal hinge.

26. *Charles Stewart Duncan*, of Lombard-street, London, for an economical oil-feeder.

26. *Josiah H. Chesterman*, of 5, Eyre-street Hill, Hatton Garden, London, artist, for temples for spectacles.

26. *George Barker*, of 3, Bentinck-street, Manchester-square, artist, for a graduated picture rod.

List of Patents

That have passed the Great Seal of IRELAND, from the 21st October to 31st October, inclusive.

To Robert William Thompson, of Adair-street, Adelphi, in the county of Middlesex, civil engineer, for an improvement in carriage-wheels, which is also applicable to other rolling bodies. —Sealed 21st October.

Peter Fairbairn, of Leeds, in the county of York, machine-maker, and Peter Carmichael, manager for Messrs. Baxter Brothers and Co., of Dundee, North Britain, flax spinners, for improvements in machinery for drawing, roving, and spinning flax, hemp, wool, silk, and other fibrous substances.—Sealed 29th October.

John Coope Haddan, of 14, Lincoln's--Inn-Fields, in the county of Middlesex, civil engineer, for certain improvements in machinery for cutting and shaping wood for ship-building and other purposes.—Sealed 29th October.

John Taylor, of the Adelphi, in the county of Middlesex, Gent., for improvements in the manufacture of explosive compounds,—being a communication.—Sealed 31st October.

Antonio James Mayer, of Ashley-crescent, City-road, in the county of Middlesex, Gent., for improvements in certain wood-cutting machines.—Sealed 31st October.

List of Patents

Granted for SCOTLAND, subsequent to October 22nd, 1846.

To John Longbottom, of Edward-street, Leeds, mechanist, for improvements in the manufacture of oil-cake, and in machinery and processes for pressing and moulding the same; which machinery and processes are also applicable to the manufacturing of other articles from plastic materials.—Sealed 27th October.

Alfred Markwick, of Langham-place, London, surgeon, for improvements in the manufacture of epithems, used for medical and surgical purposes,—being partly a foreign communication and partly an invention of his own.—Sealed 27th October.

Richard Clarke Burleigh, of Bath, for certain improvements in artificial light.—Sealed 29th October.

James Thomas Jullion, of Stratford, analytical chemist, for improvements in the manufacture of certain acids; also improvements in decomposing certain acids, and applying the products resulting therefrom to the production of certain chemical compounds.—Sealed 4th November.

William Church, of Birmingham, civil engineer, for improvements in machinery for making candlestick-pans and other articles capable of being made wholly or in part by stamping or hammering; also in machinery for making wholly or in part sockets or tubes for candlesticks, and tubes and tubular articles applicable to various other purposes.—Sealed 4th November.

John Mc Bride, of the Firm of Mc Bride and Co., cotton spinners, and power-loom cloth manufacturers, of the Allyn Works, Glasgow, for improvements in weaving.—Sealed 4th November.

Joseph Douglas, of Newcastle-upon-Tyne, rope-maker, for improvements in the manufacture of yard-line and cordage.—Sealed 4th November.

George W. Eddy, of Waterford, New York, America, for an improvement in the manufacture of cast-metal wheels for railway and various other carriages.—Sealed 4th November.

William Aitken, of Aberdeen, for certain improvements in two and four-wheel carriages.—Sealed 4th November.

James Boydell, of Oak Farm Works, near Dudley, iron-master, for improvements in applying apparatus to carriages to facilitate the draught.—Sealed 12th November.

Thomas Vaux, of Frederick-street, Gray's-inn-road, London, land-surveyor, for improvements in the manufacture of horseshoes and horse-shoe nails.

George Scholefield, of Manchester, agent, for certain improvements in machinery or apparatus to be employed for lithogragraphic printing.—Sealed 13th November.

William Anderson, of Clitheroe, cotton spinner, for certain improvements in machinery or apparatus for preparing and spinning cotton and other fibrous substances.—Sealed 19th November.

New Patents

SEALED IN ENGLAND.

1846.

To William Crane Wilkins, of Long Acre, Middlesex, for certain improvements in lamps and apparatus connected therewith; parts of which are also applicable to the raising of water. Sealed 29th October—6 months for inrolment.

William Reid, of Saint Pancras, Middlesex, engineer, for improvements in the manufacture of wire. Sealed 29th October —6 months for inrolment.

Noel Etienne Aimé Paret, of Lyons, in the kingdom of France, Gent., for improvements in finishing silk, cotton, and other fabrics, and in heating apartments. Sealed 2nd November —6 months for inrolment.

Henry Headley Parish, of Chesham-street, Middlesex, Esquire, and Samuel Rootsey, of Portland-square, Bristol, Esquire, F. L. S., for improvements in supplying and purifying water. Sealed 2nd November—6 months for inrolment.

George W. Eddy, of Waterford, in the State of New York, of the United States of America, for an improvement in the manufacture of cast-metal wheels for railway and various other carriages. Sealed 3rd November—6 months for inrolment.

Baron Charles Wetterstedt, of Rhodes Well-road, Limehouse, Middlesex, for improvements in the manufacture of sheet-metal for sheathing and other purposes; in preventing the corrosion of metal, and in the preservation of wood and other materials. Sealed 3rd November—6 months for inrolment.

William Exall, of Reading, in the county of Berks, engineer, for improvements in the construction of wheels, and in certain implements or tools employed therein; and in the mode of forming and manufacturing the tyres of wheels; which mode is applicable to making metallic rings, bands, hoops, cylinders, and other similar articles. Sealed 3rd November—6 months for inrolment.

Alfred Vincent Newton, of the Office for Patents, 66, Chancery-lane, Middlesex, mechanical draughtsman, for certain improvements in the manufacture of driving bands; parts of which improvements are also applicable to the manufacture of other fabrics,—being a communication. Sealed 3rd November—6 months for inrolment.

Gaetan Bonelli, of Milan, engineer, for improvements in bridges, viaducts, aqueducts, and other similar erections.—Sealed 3rd November—6 months for inrolment.

Henry Henson, of Hampstead, Middlesex, Gent., for a new fabric suitable for goods' wrappers, waggon covers, and other like purposes; and certain processes in the manufacture of the same. Sealed 5th November—6 months for inrolment.

Matthew Leahy, of Great George street, Westminster, civil engineer, for certain improvements in steam-engines. Sealed 5th November—6 months for inrolment.

Robert Teagle, of Hammersmith, Middlesex, plasterer, for improvements in chimney-pots and in apparatus for cleansing chimneys. Sealed 5th November—6 months for inrolment.

David Barnett, of Birmingham, merchant, for new or improved instruments or machines for effecting or facilitating certain arithmetical processes or computations. Sealed 5th November—6 months for inrolment.

Frederick Herbert Maberly, of Stowmarket, clerk, Thomas Branwhite, of Rattlesden, millwright, and Dennis Lusher, of Great Finborough, farmer, all in the county of Suffolk, for improvements in machinery for obtaining and applying, for accelerating and retarding motive power, and for giving notice of alarm in expectation of, or in actual danger Sealed 5th November—6 months for inrolment.

Thomas Yates, of Preston, in the county of Lancaster, watchmaker, for improvements in time-keepers. Sealed 12th November—6 months for inrolment.

John Mc Bride, of the Firm of Mc Bride & Co., cotton-spinners and power-loom cloth manufacturers, of the Albyn Works, Glasgow, for improvements in weaving. Sealed 12th November—6 months for inrolment.

William Bridges Adams, of Old Ford-lane, in the county of Middlesex, engineer, for certain improvements in the construction of wheel-carriages and engines moved or retarded by animal or mechanical agency; parts of which improvements are applicable to other like purposes. Sealed 12th November—6 months for inrolment.

George William Jacob, of Hoxton, in the county of Middlesex, printer, for a new manufacture of printed, patterned, ornamented, coloured, embossed, and moulded surfaces. Sealed 12th November—6 months for inrolment.

George Smith, of Camborne, in the county of Cornwall, safety fusee manufacture, for a new safety fusee. Sealed 12th November—6 months for inrolment.

Louis Hypolite Piaget, and Philip Henry Du Bois, of Wynyatt-street, Clerkenwell, Middlesex, for improvements in producing ornamental metal surfaces. Sealed 12th November—6 months for inrolment.

William Edwards Staite, of the Retreat, Peckham, Surrey, for certain improvements in lighting. Sealed 12th November—6 months for inrolment.

Robert Brett Schenck, of the city of New York, in the United States of America, gentleman, for certain improvements in the preparation of hemp and flax,—being a communication. Sealed 17th November—6 months for inrolment.

Bartholomew Beniowski, of Bow-street, Covent Garden, Middlesex, gentleman, for certain improvements in the apparatus for, and process of printing. Sealed 17th November—6 months for inrolment.

William Eaton, of Newington, Surrey, engineer, for certain improvements in obtaining motive power. Sealed 17th November—6 months for inrolment.

Thomas Masters, of Upper Charlotte-street, Fitzroy square, Middlesex, confectioner, for improvements in apparatus, and means for cooling liquids and matters, and filtering, and preventing liquids freezing. Sealed 17th November—6 months for inrolment.

John Healey, of Bolton, in the county of Lancaster, machine maker, for a new and improved woven fabric; and also certain improvements in machinery for producing the same. Sealed 17th November—6 months for inrolment.

William Brockedon, of Devonshire-street, Queen-square, gentleman, and Thomas Hancock, of Stoke Newington, gentleman, for improvements in the manufacture of articles, where India-rubber or gutta-percha is used. Sealed 19th November—6 months for inrolment.

William Ashe, of St. James's-square, in the city of Bristol, gentleman, for improvements in cleansing privies, sewers and drains. Sealed 19th November—6 months for inrolment.

Christopher Robson, of Newcastle-upon-Tyne, grocer, for improvements in machinery for dressing fruit. Sealed 21st November—6 months for inrolment.

James Denton, of Greenacres Moor, Oldham, in the county of Lancaster, mechanic, for improvements in certain parts of machines used in the preparation for the spinning of cotton, wool, and other fibrous substances. Sealed 21st November—6 months for inrolment.

James Barsham, of Bow, Middlesex, manufacturer, for improvements in manufacturing brooms and brushes. Sealed 21st November—6 months for inrolment.

William Pidding, of North-crescent, Bedford-square, in the county of Middlesex, gentleman, for improvements in carriages. Sealed 21st November—6 months for inrolment.

CELESTIAL PHENOMENA for December, 1846.

D.	H.	M.	
1			Clock after the ☉ 10m. 47s.
			☽ rises 3h. 20m. A.
			☽ passes mer. 11h 0m. A.
			☽ sets 5h. 40m. M.
	19	16	☿ Stationary
2	10	46	Ecliptic oppo. or ○ full moon.
2	12	24	♃ in conj. with the ☽ diff. of dec. 2. 51. N.
3			Occul. 119 Tauri, im. 5h. 17m. em. 5h. 47m.
	—		Occul. 120 Tauri, im. 5h. 41m. em. 6h. 27m.
3	13	29	♃ in oppo. to the ☉
4			Occul. x Geminorum, im. 12h. 55m. em. 14h. 12m.
4	3	36	Juno in conj. with the ☉
5			Occul. *k* Geminorum, im. 12h. 26m. em. 13h. 5m.
5			Clock after the sun, 9m. 12s.
	—		☽ rises 6h. 44m. A.
	—		☽ passes mer. 1h. 40m. M.
	—		☽ sets 9h. 29m. M.
	11	46	♃'s third sat. will em.
6	4	22	☿ in the ascending node
	11	26	♃'s second sat. will em.
7			Occul. *k* Cancri, im. 9h. 46m. em. 10h. 32m.
8	10	12	♀ in conj. with Juno, diff. of dec. 9. 57. N.
8			Occul. 16 Sextantes, im. 19h. 28m. em. 20h. 24m.
9	11		☽ in Apogee
	14	6	♃'s first sat. will im.
10			Clock after the sun, 7m. 2s.
	—		☽ rises 11h. 57m. A.
	—		☽ passes mer. 5h. 29m. M.
	—		☽ sets 11h. 53m. M.
10	4	20	♀ in the descending node
	9	16	☽ in □ or last quarter
	17	58	☿ in Perihelion
11	8	35	♃'s first sat. will em.
11	11	59	☿ in inf. conj. with the ☉
12	15	47	♃'s third sat. will em.
	22	22	☿ in conj. with ♀ diff. of dec. 1. 57. N.
13	14	3	♃'s second sat. will em.
13	22	35	☿ in conj. with Juno, diff. of dec. 7. 38. S.
14			Occul *α*1 Libræ, im. 18h. 39m.
15			Mercury R. A. 1h. 53m. dec. 14. 17. N.
	—		Venus R. A. 17h. 29m. dec. 23. 27. S.
	—		Mars R. A. 15h. 12m. dec. 17. 31. S.
	—		Vesta R. A. 12h. 31m. dec 3. 12. N.
	—		Juno R. A. 17h. 3m. dec. 12. 46. S.
	—		Pallas R. A. 17m. dec. 18. 24. S.
	—		Ceres R. A. 3h. 24m. dec. 13. 37. N.
15			Jupiter R. A. 4h. 34m. dec. 21. 15. N.
	—		Saturn R. A. 21h. 55m. dec. 14 16. S.
	—		Georg. R. A. 0h. 39m. dec. 3. 28. N.
	—		Mercury passes mer. 23h. 13m.
	—		Venus passes mer. 23h. 56m.
	—		Mars passes mer. 21h. 36m.
	—		Jupiter passes mer. 10h. 57m.
	—		Saturn passes mer. 4h. 19m.
	—		Georg. passes mer. 7. 2.
15	9	30	♂ in conj. with the ☽ diff. of dec. 1. 45. S.
	12	41	♀ in super. conj. with the ☉
16	16	1	♃'s first sat. will em.
17	1	53	☿ in conj. with the ☽ diff. of dec. 0. 50. S.
18	0	42	Ecliptic conj. or ● new moon
18	1	37	♀ in conj with the ☽ diff. of dec. 4. 44. S.
	10	30	♃'s first sat. will em.
	17	53	Pallas in □ with the ☉
19	18	19	♅ stationary
20			Clock after the sun 2m. 12s.
	—		☽ rises 9h. 13m. M.
	—		☽ passes mer. 1h. 52m. A.
	—		☽ sets 6h. 38m. A.
	4	59	♃'s first sat. will em.
	16	39	♃'s second sat. will em.
21	1	45	☿ greatest hel. lat. N.
	4		☽ in Perigee
	13	55	☿ stationary
	—		Occul. z1 Aquarii, im. 4h. 34m. em. 5h. 4m.
	16	12	☉ enters Capricornus,—Winter commences
22	8	25	♄ in conj. with the ☽ diff. of dec. 6. 7. S.
24			Occul. 21 Piscium, im 6h. 35m. em. 7h. 32.
24	5	58	♃'s second sat. will em.
25			Clock before the sun 0m. 18s.
	—		☽ rises 11h. 48m. M.
	—		☽ passes mer. 6h. 19m. A.
	—		☽ sets Morn.
	6	36	☽ in □ or first quarter
	8	6	♅ in conj. with the ☽ diff. of dec. 2. 7. S.
	12	25	♃'s first sat. will em.
27	6	54	♃'s first sat. will em.
29	13	35	♃ in conj. with the ☽ diff. of dec. 2. 46. N.
	—		Occul. δ3 Tauri, im. 8h. 19m. em. 9h. 33m.
30			Occul. 119 Tauri, im. 14h. 49m. em. 15h. 49m.
30			Occul. 120 Tauri, im. 15h. 28m. em. 16h. 26m.
31	8	34	♃'s second sat. will em.
31	21	12	♅ in □ with the ☉

J. LEWTHWAITE, Rotherhithe.

THE

LONDON JOURNAL,

AND

REPERTORY

OF

Arts, Sciences, and Manufactures.

CONJOINED SERIES.

No. CLXXXI.

RECENT PATENTS.

To John Nott, *of the city of Cork, Gent., for certain improvements in the means of communicating intelligence from one place to another.*—[Sealed 20th January, 1846.]

These improvements in the means of communicating intelligence from one place to another consist in certain novel arrangements of apparatus, by which audible and visible signals can be given through the agency of electro-magnetism from any place (as a railroad station) to another place (as another railroad station), situate at any distance therefrom.

In Plate XVIII., fig. 1, represents the external appearance of the apparatus, as seen in front; fig. 2, is a vertical section, taken transversely through the apparatus, nearly at its centre; fig. 3, represents the internal construction and arrangement of the working parts of the apparatus, as they would appear if the dial-plate and front part of the case were removed; and fig. 4, is a horizontal section of the apparatus, taken below the magnets, shewing the mechanism by which the course of the electric fluid may be changed from the electric telegraph to the signal-bell.

In the front of the box or case, enclosing the machinery, a circular dial-plate (see fig. 1,) is fixed, on which is marked four series of the letters of the alphabet, which letters are pointed out by the long arm of the index; and also two concentric circles of numerals, which latter are indicated by the short arm of the index. This plate is graduated on its face into ninety-six equal divisions, formed in a circle; and to each of these divisions one of the letters of the alphabet or one of the numerals refers. Upon the outer end of an arbor *a*, passing through the centre of the dial-plate, a hand or index *b*, is affixed, which is carried round upon the face of the dial-plate by successive actions of the mechanism, produced by means of the electric fluid; each successive action moving the index over one space of the graduated circle, so as to enable the operator to leave the point of the index in a state of rest, opposite to any letter or numeral, as the case may be; and, by repetitions of the like movements and rests, to point to such letters as will spell, or numbers that will indicate, the word required to be communicated. These actions of the mechanism are effected by currents of electricity, through the agency of a key or lever, rising or falling at the touch of the operator, as in a piano-forte.

The electric fluid is derived from a galvanic battery or magneto-electric machine, situate near the apparatus, as at A, B, fig. 4, and passes, by wires coiled round electro-magnets, from one pole to the other pole of the battery. Two electro-magnets, C, C, D, D, are attached to the vertical back-board *c, c*, of the apparatus, as shewn in figs. 2, and 3; and in the same plane, nearly concentric with these magnets, is a ratchet-wheel *d*, fixed upon the arbor *a*; which latter passes through the centre of the dial-plate, and carries the hand or index *b*. Two lever armatures *e, e*, are supported by fulcrum axles, turning in the brackets *f, f*, which armatures cross each other, and their movements are rendered simultaneous by a connecting link *g*, immediately over the axis of the ratchet-wheel *d*. To the extremities of the inner arms of these lever armatures two pallets *h, h*, are connected, by joints; which pallets are pressed against the periphery of the ratchet-wheel by delicate springs, causing the pallets to take into the teeth of the ratchet-wheel; and, by the rising and falling of the armatures, these pallets move the ratchet-wheel round;—the extent of action of the pallets being limited by two latch-stops *i*, *j*, which give rise to a dead-beat movement of the index, as it is carried round the dial-plate. The outer extremities of the armatures bear upon slight springs *k*, *k*, fixed to the back-board of the instrument.

A third electro-magnet E, E, is affixed to the back-board (as shewn in figs. 2, and 3,), and is intended to give motion to the machinery of the signal-bell, attached to the telegraph. The armature of this magnet is shewn at *l*, *l*, and is a T-formed lever, supported at the extremities of the edge of its longitudinal bar by pivots, bearing in the brackets *m*, *m*, projecting from the back-board. The arm of this lever *l*, passes through an opening in the back-board, and lies inclined, as shewn in fig. 2. When this armature is attracted by the magnet, it will be drawn up into a horizontal position, and, in rising, the extremity of the arm will take into the fork at the end of the lever *n*, and thus cause the hammer *p**, to strike upon the bell or gong F.

The means by which the electric fluid is conducted from the battery, through the wires of the electro-magnets, to the corresponding apparatus at the distant station will be clearly understood by the following description:—Two wooden cylinders G, H, are supported on horizontal axles, by standards fixed to the longitudinal support I, I. Two separate strips of metal, as conductors, are passed nearly round the circumference of each of these cylinders, leaving unoccupied a conducting portion on each cylinder between the ends of the strips. Upon the support I, I, eight erect springs 1, 2, 3, 4, 5, 6, 7, 8, are fixed; which springs severally press against the peripheries of the cylinders G, and H. The springs 2, and 3, are connected by a conducting strip of metal (see fig. 4,), and the springs 6, and 7, are also connected in like manner; the latter being perfectly detached or insulated from the former. A wire 9, connected with the pole A, of the battery, leads to the stud K, where it is held fast by a binding-screw; and to this stud K, the end of another wire 10, is soldered, which passes under, and is attached to the operating finger-key J, and, bending down, terminates immediately over a cup of mercury 11, best seen in fig. 2. The end of a wire 12, is soldered to the erect spring 6, and is brought round into communication with the mercury in the cup 11. On the key J, being depressed by the finger of the operator, the pendent end of the wire 10, will be brought into contact with the mercury in the cup 11, when the electric fluid from the battery A, will be instantly conducted from the pole A, of the battery, through the wires 9, 10, 12, to the spring 6, and from the spring 6, through its connection (see fig. 4,), to the spring 7, and thence over the band on the cylinder H, to the spring 8, and from that spring, by a wire 13, to one pole of the electro-magnet C, as shewn in fig. 3. The electric fluid will then pass through the coils of this magnet C, and thence, by a wire, to one pole of the magnet D, and, proceeding through the coils of this magnet D, will then descend from its other pole by the wire 14, to the stud L, (see fig. 4,); to the under part of which stud it is soldered. Another wire 15, is attached to this stud L, by a binding-screw, from which it proceeds to the telegraph at the distant station, and the current of electricity is by that means conducted through the electro-magnets of such distant telegraph, which is precisely similar in construction to the apparatus above described. The electric fluid having passed through this course returns from the distant telegraph by the wire, 16, to the stud M, (see fig. 4,); which wire is secured thereto by a binding-screw. Another wire 17, soldered to the under part of this stud M, conducts the electric fluid to the erect spring 4, from whence it proceeds over the band on the cylinder H, to the erect spring 3, and from that spring by a wire 18, to the stud N; from the binding-screw of which another wire 19, soldered or connected to the under part of this stud N, leads the current of electricity to the other pole B, of the battery, and thus the electric circuit is completed.

It will now be seen, that when the finger of the operator depresses the key J, the pendent end of the wire 10, being thereby brought into contact with the cup of mercury 11, will cause the electric fluid from the battery to pass through the circuit, as described. The electric fluid, in proceeding through the coils of the electro-magnets C, and D, developes an attractive force, which, acting upon the lever armatures *e*, *e*, attracts the arms of those levers toward the poles of the magnets, and, in so doing, raises the pallets *h*, *h*; one of which then moves the ratchet-wheel *d*, and with it the arbor *a*, and index-hand *b*, through a space equal to one division of the circumference of the dial-plate. On raising the finger from the key J, the wire 10, is withdrawn from the mercury cup 11, and the circuit of electricity becoming thereby broken, all the parts will fall into their original position, as shewn in fig. 3; and the other pallet will move the ratchet, and thereby cause the index-hand to pass over another space or division of the dial. A repetition of the touch upon the key J, produces the same effect as described, and moves the index-hand through another space or division of the dial-plate, and so on,—the operator resting when the hand *b*, arrives at any letter or number upon the dial which he wishes to have noted; and by a succession of these movements and rests, the letters or symbols of any desired word or words may be indicated at the distant station.

In commencing the telegraphic communications, it is desirable, in the first place, to indicate whence it proceeds, which may be done by giving one, two, three, or any other conventional number of strokes on the signal-bell. In order to effect this at the remote station, a current of electricity is conducted in the way above described; but a slight change in the positions of the cylinders G, H, of the apparatus is first made.

It has been already stated, that the wooden cylinders G, and H, have metallic conducting bands placed partially round them; which bands leave non-conducting portions on the periphery of the wooden cylinders. It is by means of these that the operator is enabled to change the current of the electric fluid from the telegraph to the bell, and *vice versâ*, by a simple movement. At figs. 3, and 4, (which represent the conducting wires in connection with the telegraph) it will be seen that the erect springs 1, and 5, bear against those parts of the cylinder G, over which the metallic bands do not extend,—consequently those springs are at this time insulated;

but if the cylinders G, H, were turned round simultaneously about a quarter of a revolution, the metallic bands of the cylinder G, would be brought into connection with the springs 1, and 5; and at the same time the springs 4, and 8, would become insulated, by having the non-conducting parts of the cylinder H, brought into contact with them. This is effected by the movement of a sliding-bar P, in front of the apparatus, shewn at fig. 1; which bar is attached to parallel levers *p, p,* fixed upon the outer end of the axles of the cylinders G, H; and at the centre of the bar is an erect index *q*. If the bar is slidden toward the left, as shewn in the figure, its index *q*, will point to the mark T, above, (referring to "telegraph,") and the cylinders will be situate as shewn at fig. 3; the apparatus being then in a position to communicate with the telegraph. But if the bar P, be slidden to the right, so that the index *q*, points to the mark B, referring to the "bell," then the cylinders G, H, will be turned round about a quarter of a rotation; by which means the conducting bands of the cylinder G, will be brought into contact with the springs 1, 5, and the bands of the cylinder H, will be withdrawn or insulated from the springs 4, and 8. When the cylinders G, H, have been thus turned round, the electric fluid will be conducted through the magnet E, E, instead of following the course previously described.

The finger of the operator being now applied to the key J, the electric fluid will pass from the pole A, of the battery, by the wires 9, 10, and 12, to the spring 6, and thence, passing over the band of the cylinder G, will proceed through the conducting spring 5, and wire 20, up to one pole of the magnet E, E. The electric current will now pass through the coils of the magnet E, E, and descend by a wire 21, leading from the opposite pole of the magnet; which wire is connected to the wire 14, which is soldered to the stud L, as previously mentioned and shewn at fig. 4. This causes the electric fluid to pass from the stud L, through the wire 15, to the distant telegraph, and return again by the wire 16, to the stud M, as before explained. This position of the cylinders G, and H, being such as to carry the electric fluid through the coils of the electric magnet E, the lever armature *l*, will be drawn up into a horizontal position, and in so doing will cause the hammer p^*, to strike the gong or bell F.

The patentee next describes certain appendages which he proposes to adapt to the electric telegraph. These appendages consist, firstly, of a commutator, or pole changer, for reversing the direction of motion of the electric current; and, secondly, of a rheopeter, for changing the direction simply of the electric current; these being for the purpose of separating any number of intermediate stations from the telegraphic circuit, or of connecting any of those stations with the circuit, when desired. Fig. 5, is a front elevation of the commutator, and fig. 6, a top view of the same. A, is a block of wood, and B, a wooden cylinder, turning upon an axle mounted in standards. Upon the periphery of this cylinder seven strips of copper are arranged, as shewn in fig. 7, which represents the periphery of the cylinder B, extended in a plane. One of these strips of copper, *a*, is imbedded transversely in the periphery of the cylinder; the other six strips, *b*, *c*, *d*, and *e*, are also imbedded, and extend partially round the periphery of the cylinder. These latter strips are intended to reverse the direction of motion of the electric current: the strips d^1, and e^1, are directly connected by two wires with *b*, and *c*; and the strips *d*, and *e*, are alternately connected with *b*, and *c*, by two wires crossing each other, one of which, *f*, forms a communication between *b*, and *e*, and the other wire *g*, between *b*, and *d*. These wires, *f*, and *g*, are insulated from each other, and deeply imbedded into the cylinder, and they are covered by a transverse piece of ivory *h*. Four erect springs, *i*, *k*, *l*, and *m*, are affixed to the base block A; their upper parts pressing against the periphery of the cylinder. A handle *n*, is affixed to the axle, for the purpose of turning the cylinder round; and an elongation of the handle forms a pointer, to indicate the extent to which the cylinder is to be moved. A wire is attached to each of the springs, for the purpose of connecting this instrument with the electric circuit; and by turning the cylinder to the right or left, the direction of the electric current may be changed, or, in other words, the poles of the battery may be reversed.

The rheopeter is shewn in horizontal view at fig. 8, and in vertical section at fig. 9. A, is a circular block of wood, in which two permanent magnets are imbedded; their poles extending upwards, as at N, S, N*, S*. *x*, *y*, *z*, are three glass cups containing mercury. *a*, *a*, is a bar of soft iron, supported in a horizontal position by the vertical pin *b*; round this bar an insulated copper wire *c*, *c*, is coiled, the ends of which extend at right angles to the bar, and are bent down so as to touch the surface of the mercury in the cups. A wire *d*, being supposed to communicate a current of electricity (say from London) to the mercury in the cup *x*, that electric current will be conducted by the wire *c*, to the mercury in the cup *y*, and from thence pass on by the wire *e*, to the place of its destination, (say Rugby,) and thence through the remainder of the telegraphic circuit, back again to its starting point. As the electric fluid thus passes, the bar *a*, becomes magnetized, and its ends are attracted by the poles of the permanent magnets S, and N*, as shewn at fig. 8. If, for example, the current of electricity is required to be cut off from the telegraph at Rugby, and directed, say towards Birmingham, the poles of the battery are changed, by means of the apparatus shewn at fig. 5. The direction of motion of the electric current being thus reversed, it will, in passing through the wire *d*, figs. 8, and 9, cause the ends of the bar *a*, to be attracted by the reverse ends of the magnets, that is, N, and S*; by which means the pendent end of the wire *c*, will be brought from the mercury cup *y*, to the mercury cup *z*, and the current will then, instead of proceeding through the wire *e*, as before, take its course through the wire *f*, and so on, to Birmingham; by which means the telegraph at the Rugby station is effectually thrown out of the circuit.

When the circuit of the telegraphic apparatus is required to be closed, the key J, fig. 1, must be depressed. In order to keep the circuit closed, the draw-stop Q, Q, is pulled out, which draws down a small lever R, into the position shewn by dots in fig. 2. This lever R, keeps the key in a depressed position, and the instrument is thereby prepared for receiving communications from a distant telegraph.

At figs. 10, and 11, a modification of this rheopeter is shewn, in which the electro-magnet is made to move in a vertical instead of a horizontal plane. The advantage of this latter instrument consists in the facility which it affords of changing the local direction of the electric current, without interrupting the current itself in so doing. This results from the manner in which the wire of the electro-magnet is coiled. Upon each half of the soft iron bar there is a separate coil of insulated wire; the length of the wire of each of these coils proceeds from the extremity of the bar to its middle, and then returns, by overlapping, to the same extremity of the bar where the ends of the wire, forming the coil, are made to dip into mercury cups. By this arrangement, one of these coils is dextrorsum, and the other sinistrorsum relatively to the side of the bar at which the electric current enters the coil. Then, if the electric current be supposed to branch off in two different directions, and pass from the same side of the bar, through these two coils simultaneously, the electric current would flow in the same direction through both coils, and, consequently, the polar unity of the resulting electro-magnet would be preserved. It is therefore obvious, that when the electric current enters either coil from the same side of the bar, a similar polarity results, and a corresponding motion is communicated to the bar, by the influence of the permanent magnets, as will be subsequently described; and when the electric current enters either coil from the opposite side of the bar, the polarity, and, consequently, the motion, of the bar, is thereby reversed. In these alternating motions, when the bar becomes horizontal, as seen in the drawing, the ends of the two coils are immersed in the mercury cups, and therefore, without interrupting the electric current, its local direction may be changed, by depressing either end of the bar, as will be seen by the following description of the several parts of the instrument.

Fig. 10, is a plan view of the instrument, and fig. 11, is a vertical section, taken in the dotted line 1, 2, of fig. 10. A, is a block of wood, forming the base; and N^1, S^1, N, S, are two permanent magnets, having their similar poles opposite in the same vertical plane: these magnets are fixed to the base A, by the brass clamps C, C. D, D, are two brass standards, screwed to the base, and carrying set screws with sunken centres, which form the bearing-points of the horizontal axle E, which passes through the soft iron bar F. Round one-half of this bar a double coil G, of insulated wire is wound; and the ends of this wire dip into the mercury cups H, and I. Round the other half of this said bar there is a similar coil K, of wire, the ends of which dip into the mercury cups L, and M. The two mercury cups L, and H, at the same side of the bar, are both connected by the wires P^1, P, with the stud O, to which the main circuit wire V, is fastened, by a binding screw. The mercury cup M, is connected by the wire S, with the stud T, to which, by a binding screw, the current-entering wire U, of the telegraph is fastened. The mercury cup I, is connected by the wire Q, with the stud R, which latter is connected by the small branch wire W, with the current-issuing wire of the telegraph, which passes to the remote terminus. Now, for example, suppose the electric current to be passing from the stud O, to the mercury cup L, it will then pass through the coil of wire K, to the mercury cup M, and so on through the current-entering wire U, of the telegraph. The electric current now passing through a sinistrorsum coil, the extremity Y, of the iron bar becomes a north pole, and the other, Z, a south pole. This extremity Y, of the bar is then repelled by the pole N^1, of the permanent magnet, and attracted by the pole S^1; it therefore descends, and releases the ends of the coil G, from the mercury cups H, and I. The telegraph is then within the electric circuit.

If the direction of motion of the electric current be now changed, the current-entering wire U, becomes the current-issuing wire, and the stud R, is now connected with the current-entering wire. The electric current then passes from the stud T, to the mercury cup M, and thence through the coil K, to the mercury cup L, and so on to the main wire V. As the electric current, in this case, passes through the coil K, from the opposite side of the bar, this said coil is thus rendered dextrorsum; the polarity of the iron bar is therefore changed, the end Z, becomes a north pole, and the end Y, a south pole. This end Y, of the bar is therefore repelled by the pole S^1, of the permanent magnet, and attracted by the pole N^1. The extremity Y, of the bar is therefore raised from its inclined position, as in the first instance, and releases the ends of the coil K, from the mercury cups L, and M, at the same time that its other extremity, being depressed, immerses the ends of the coil G, in the mercury cups H, and I, and this immersion takes place before the ends of the coil K, leave the mercury cups L, and M.

As the stud R, is now externally to the telegraph connected with the current-entering wire, the electric current, instead of passing through the telegraph, branches off to the stud R; it then passes to the mercury cup I, thence through the coil G, to the mercury cup H, and so on to the main wire V. The telegraph is thus, without any interruption of the electric current taking place, put out of the circuit; and as the electric current now passes through a sinistrorsum coil, the bar retains its position, until the direction of motion of the electric current is reversed, to bring the telegraph again within the circuit.

Fig. 12, represents, in elevation, one of the posts for supporting the circuit wires of the telegraph, along the line of communication. This post is of wood, and is to be sunk about five feet into the earth—the sunken portion being imbedded in Roman cement, or any other hydraulic mortar, as indicated in the drawing. A wooden lantern-shaped box completely covers about 16 inches of the upper end of the post, so as to protect this portion of the post (which is to be well varnished) from the humidity of the atmosphere. The box is made in two parts; the cover is of a pyramidical form, and is firmly fixed on the post; the case is made to slide up and down upon the post, and is fastened to the cover, so as to completely envelope the varnished portion of the post, and the broad binding screw clamps thereon, which carry the telegraphic wires. No metal whatever is used in the construction of this box, to the outside of which an insulated lightening conductor, passing down to the earth, is attached.

The patentee claims, Firstly,—the construction and use of the direct action electro-magnetic telegraph, as before described; and particularly the arrangement of the letters or symbols on the dial plate; and the means applied to communicate direct circular motion to the ratchet-wheel, and the index, by the alternate motion of two jointed lever armatures, working simultaneously, by being connected with one another, in the prolongation of the vertical diameter of the wheel; the pendent portions of these lever armatures forming the pallets of the escapement, and taking into the teeth of the ratchet-wheel; their ascending and descending motions being regulated by the latch-stops, which produce a dead-beat escapement;—he also claims this escapement, whether it be worked by two levers, as described, or by one lever only. Secondly,—the adaptation of the electro-magnets of the telegraph, as before described and represented in the drawings, whereby they form what may be called a magnetic circle, and attract the extreme and mediate ends of the armatures simultaneously, when the electric circuit is closed; and by the proximity of the bell-electro-magnet and its armature, one edge of which is always in contact with the poles of the said magnet, the reactive force of electrical induction is brought to bear so as instantly to destroy the attractive force of the electro-magnets of the telegraph, as soon as the electric circuit is opened. Thirdly,—the arrangement of the machinery of the signal-bell of the telegraph, as before described. Fourthly,—the means employed for throwing the telegraph out of the electric circuit, and bringing the striking machinery of the bell into the electric circuit, and *vice versâ*; and also of permanently closing the said circuit by means of a lever and draw-stop, as exhibited in the drawing. Fifthly,—the means of communicating with all the stations simultaneously, or throwing any of the said stations out of communication, at pleasure, by the employment of the commutator and rheopeter, as hereinbefore described. And, Lastly,—he claims the said improvements, however they may be varied in their constructive details, so long as the general arrangement of parts, as above set forth, is retained.—[*Inrolled in the Petty Bag Office, July,* 1846.]

Specification drawn by Messrs. Newton and Son.

To **Thomas Murgatroyd Dean,** *of Stockport, in the county of Chester, engineer, for certain improvements in machinery or apparatus, applicable to the furnaces or fire-places of steam-engines, or other boilers.*—[Sealed 25th February, 1846.]

These improvements in machinery or apparatus, applicable to the furnaces or fire-places of steam-engine or other boilers, are intended to effect a more perfect consumption of the smoke and other combustible vapours, and consequently economise fuel. The invention consists, firstly, in a double self-acting feeding apparatus, one side of which is caused to supply the furnace with fuel, whilst the other is at rest, and *vice versâ,* alternately; and, secondly, in placing a partition wall in the furnace, between the fire-doors and the bridge of the same, and employing two dampers at or about the bridge, which are opened and closed alternately, by certain levers and rods connected with the feeding apparatus.

In Plate XIX., fig. 1, is an end view of a steam-boiler and furnace, with the improvements applied; fig. 2, is a transverse section, taken in front of the bridge of the furnace, and fig. 3, is a horizontal section, taken below the boiler. *a, a,* is the foundation brick-work, supporting the boiler *b, b;* *c, c,* is the "dead plate" of the furnace; and *d, d,* are the fire-bars. *e,* is the main driving-shaft, to which motion is communicated by a strap passing around the pulley e^1, at its upper end, or by any other convenient means. Upon the main driving-shaft *e,* is a pulley *f,* which, by means of the cross-straps *g,* and *h,* drives, alternately, the shaft *i,* of the right-hand feeding apparatus, and the shaft *j,* of the left-hand feeding apparatus. These shafts have each a fast and loose pulley at their upper end, and the requisite shifting of the straps from the fast on to the loose pulleys is effected in the following manner:—A small crank *k,* is caused to revolve by means of a worm on the driving-shaft *e,* actuating the worm-gearing *l;* this crank *k,* has a lever attached to it, furnished with two studs *m,* and *n,* which, as the crank revolves, causes the strap-lever *o,* to vibrate, and throw one strap on the loose pulley, and the other on the fast one; thus alternately setting in motion and stopping each feeding apparatus. It will be seen, in figs. 2, and 3, that there is a partition wall *p*, in the furnace, reaching from the fire-bars to the bottom of the boiler, and extending from the bridge about half-way to the fire-doors; and that there are two dampers *q*, and *r*, behind the bridge of the same, one of which is open, and the other closed. These dampers are connected to the strap lever *o*, by cranks and levers; so that when one side of the feeding apparatus is supplying fuel to the fire, the damper upon that side is closed, and the damper on the opposite side is open, and *vice versâ*. In the drawing, the right-hand feeding apparatus is represented at work, and that upon the left-hand as stationary. The right-hand damper being closed, the smoke, &c., from the fresh coal, will have to pass round the partition wall *p*, and over the fire at the left-hand of the furnace, and will thereby be consumed. It will be evident that, when, by the revolution of the crank *k*, the feeding apparatus and damper on the other side of the furnace are brought into action, the passage of the smoke will be reversed.—[*Inrolled in the Petty Bag Office, August*, 1846.]

Specification drawn by Messrs. Newton and Son.

To William Spiby, *of Carrington, in the county of Nottingham, engineer, for improvements in the constructing of furnaces, and heating water and other fluids.*—[Sealed 1st April, 1846.]

The improvements in the construction of furnaces, which constitute this invention, are represented in several views in Plate XIX. Fig. 1, is a longitudinal vertical section of a furnace for a cylindrical steam-boiler; fig. 2, is a transverse section on the line 1, 2, of fig. 1; and fig. 3, is a sectional plan view, with the boiler removed. *a*, *a*, are the fire-bars; *b*, is is the bridge; and *c*, c^1, c^2, c^3, indicate the flue. The flue is so arranged, that the heated gases, on leaving the furnace, pass along the central portion *c*, of the flue, beneath the centre of the boiler; then returning along the portion c^1, under one side of the boiler, they pass through the flue c^2, beneath the bridge, and enter the portion c^3, along which they proceed to the chimney. The bridge *b*, is contracted, so that it is much narrower than the width of the fire-place; and, above the bridge, on each side, there is an opening from a passage *d*. These passages extend from the front of the furnace to the fire-bridge, and through each passage a current of air is admitted. The object of this arrangement is to bring in a current of air from opposite sides of the furnace on to the bridge, in order that the products passing from the furnace may meet such currents of air, and receive a sufficient supply of oxygen, for effecting the combustion of the unignited products. The arrangement and direction of the air passages may be varied, provided they are introduced above the bridge, so as to cause the air to cross over in opposite directions.

The above improvements are equally applicable to the furnaces of other steam-boilers, and also to those of boilers or pans for evaporating fluids, and to other arrangements of furnaces. The adaptation of these improvements to the furnaces of that description of steam-boilers denominated wagon-boilers, is represented at fig. 4, which is a sectional plan view of the furnace and flues, with the boiler removed. In this arrangement, the parts, though modified, are similar to those shewn at fig. 3; but the flue is extended by the portions c^4, c^5, and c^6, so as to pass once more beneath each side of the boiler. The course of the heated gases is indicated by the arrows.

In each of these cases, the furnace and flue are outside the boiler; but figs. 5, and 6, represent a boiler with its furnace and flue inside; fig. 5, being a longitudinal section, and fig. 6, a transverse section thereof. The flue, in this arrangement, does not return and pass under the bridge, as above-mentioned; but the bridge, or rather the passage over it into the flue, is still contracted, and the air is introduced, in a similar manner, by passages *d*.

Fig. 7, is a vertical section of a boiler or pan, suitable for heating or evaporating fluids, set in the improved furnace; and fig. 8, is a sectional plan view of the furnace and flue. The flue *c*, does not pass under the bridge, but proceeds from the furnace round the boiler or pan to the chimney;—in most cases it will not be necessary to reduce the opening over the bridge. The air is introduced just above the bridge by the passages *d*. Other kinds of furnaces, such as those employed for kilns and other purposes, may be constructed in a similar way to the one last described.

The patentee claims, Firstly,—the so constructing furnaces for steam and other boilers that the flues thereof shall pass under the bridges, and the bridges be so arranged as to be contracted, and have air introduced above them at the opposite sides, as described in respect to figs. 1, 2, 3, and 4. Secondly,—the so constructing steam and other boiler furnaces that air may be introduced at the opposite sides of and over the bridge; the openings over which into the flues are contracted in respect to the fire-bars, as described in respect to figs. 5, and 6. Thirdly,—the so constructing boiler and other furnaces that air is introduced on either side just over the bridge, so as to tend to cross over from side to side, as shewn and described in respect to figs. 7, and 8.—[*Inrolled in the Inrolment Office, October,* 1846.]

To William Green, *of Hyde, in the county of Chester, baker, and* Mark Walker, *of the same place, grocer, for certain improved apparatus for facilitating the putting on of boots to the feet.*—[Sealed 11th March, 1846.]

This improved apparatus is designed to facilitate the operation of the putting on of boots, and also entirely obviate the straining of the muscles of the arms and back, frequently experienced under the old method of pulling on boots. The apparatus consists of a semi-circular frame, supported upon three legs or rods, affixed to a bottom board or other solid base; two of the legs being furnished with suspending hooks, upon which the boot is hung, by means of the ordinary loops or straps at the top of the boot, and the other leg having a hold-fast or clip for holding the back of the boot firm whilst the foot is being thrust into it. These hooks and clip are adjustable to any height by means of set-screws, to accommodate any length of boot. There may also be appended to the bottom board or base a small contrivance, similar to a common boot-jack, for facilitating the taking off of boots.

In Plate XVIII., fig. 1, is a plan or top view of the apparatus for facilitating the putting on of boots to the feet; and fig. 2, is a side elevation of the same. *a, b, c,* are the three legs or standards of the apparatus, supporting the semicircular frame *d,* and firmly fixed by screws or otherwise to the bottom board or base *e.* The legs *a,* and *b,* of the apparatus are provided with mortises or slots *f, f,* in which the suspending hooks *g, g,* are adjustable, by means of the set-screws *h, h.* The inner sides of these legs *a,* and *b,* are furnished with square notches or recesses, represented as dotted at *i, i,* into which the square shoulder *k,* of the hook *g,* fits, to prevent the hooks from slipping, should the set-screws *h, h,* not be screwed fast enough. The leg *c,* of the apparatus has also a mortise in which the hold-fast or clip *m,* may be adjusted, by means of the set-screws *n.* When this apparatus is required to be used, the boots must be hung by the ordinary loops upon the hooks *g, g,* and the back part of the top of the boot placed in the clip *m*; the hooks and clip must be adjusted to the required height, and the set-screws *h, h,* and *n,* screwed fast. The boot being thus firmly supported and held, the foot may be easily thrust into it, without any of that unpleasant straining and exertion experienced under the method now commonly practised of pulling on the boots by hand. *o, o,* is a contrivance similar to a common boot-jack, for facilitating the taking off of boots, which, when in use, is turned over upon its hinges *p,* and is supported by the rest *g.*—[*Inrolled in the Petty Bag Office, September,* 1846.]

Specification drawn by Messrs. Newton and Son.

To Alexander Angus Croll, *of Suffolk-street, Clerkenwell, for improvements in gas-meters.*—[Sealed 13th May, 1846.]

This invention relates to that construction of dry gas-meters wherein one partition or diaphragm only is used; which diaphragm approaches to and recedes from the plane of attachment to the side of the meter, but does not pass through the same; so that the flexible material whereof the diaphragm is partly formed, is bent only in one direction. The improvements consist in the application to the above meter of an apparatus for working the valve, which depends for its action upon the use of a tumbler, so formed, that on being moved to a point just beyond the horizontal or central position, the tumbler will fall over and instantly change the position of the valve.

In Plate XX., fig. 1, is a vertical section of the improved meter; fig. 2, is a vertical section, taken at right angles to fig. 1; fig. 3, is a horizontal section, taken on the line A, B, of figs. 1, and 2; fig. 4, is a plan view of the meter, with the top plate removed; fig. 5, is a section of the valve, on the line C, D, of fig. 3; and fig. 6, is a section, on the line E, F, of the same figure. *a*, is the central part of the diaphragm, formed of metal, and *b*, is the flexible material, fastened to the edge of the part *a*, and to the side of the meter at *c*, *c*; the part *a*, is so large that it cannot pass beyond the point *c*, where the outer edge of the flexible material is secured, but simply advances to and recedes therefrom; hence the bending of the flexible material will only be upon one surface. The diaphragm is supported in a vertical position by the frame *d*, *d*, which is jointed to it, and to the upright rod *e*, supported by the arm *f*, which is fixed on the vertical spindle *g*; the diaphragm is guided in its movements by the rods *h*, *h*, the lower ends of which are connected by short links to the part *a*, and their upper ends are suspended by a horizontal rod *i*, (inserted through them), from two arms *j*, *j*, fixed to the upper side of the cylindrical portion of the meter. Upon the top of the spindle *g*, is fixed an arm *k*, carrying a roller, which, being moved to and fro within the inverted arch *l*, on the tumbler tube *m*, will cause either end of that tube, alternately, to be raised from a depressed position to a point beyond the horizontal, when the weight, preponderating at the other end, will occasion the instantaneous descent of that end, and this movement is communicated to the valve by the means hereafter described;—the tumbler-tube falls on a spring *n*, at either side, and thus any shock is prevented. The tumbler-tube contains quicksilver, but shot may be substituted, and the tumbler apparatus may be otherwise varied, and yet retain the same character of action.

o, is an arm, fixed to the tumbler, and provided with a fork *p*, which acts on a plate or arm *q*, on the axis of the valve *r*, and by this means the position of the valve is changed at each movement of the tumbler, which, as will be readily understood, derives its motion from the reciprocating action of the diaphragm, communicated to it through the agency of the parts *d*, *e*, *f*, *g*, *k*, and *l*. The valve *r*, is contained in a valve-chest *s*, (to prevent the gas from coming into contact with the works in the upper part of the meter) into which the gas enters from the supply pipe through the passages *t*, *u*; by the movement of the valve, the gas is alternately admitted on either side of the diaphragm, and, after acting upon it, proceeds through the passages *v*, *w*, to the pipe leading to the burners. The motions of the diaphragm are registered by means of a detent or driver *x*, on the upper part of the spindle *g*, taking into a ratchet-wheel *y*, connected with an ordinary registering apparatus or index.

The patentee claims, as his invention, combining the use of tumbler apparatus for actuating the valves of a dry gas-meter, having only one partition, which is so arranged as only to approach and recede from the point of fixing of the flexible material, as above described.—[*Inrolled in the Inrolment Office, November*, 1846.]

To George Scholefield, *of Manchester, in the county of Lancaster, agent, for certain improvements in machinery or apparatus to be employed for lithographic printing.*—[Sealed 4th November, 1845.]

These improvements in machinery or apparatus to be employed for lithographic printing consist in an entirely novel arrangement of revolving or rotary mechanism for the above purpose, whereby a great saving both in time and power is effected. The mechanical construction, as well as the mode of operating the machine, will be readily understood by reference to Plate XX., in which fig. 1, represents a longitudinal section of the improved arrangement of machinery or apparatus to be employed for lithographic printing. Fig. 2, is a transverse section, and fig. 3, is a side elevation of the same. *a*, *a*, is the frame-work of the apparatus, and *b*, *b*, the main driving shaft, upon which is mounted the spur-pinion *c*. This pinion drives the spur-wheel *d*, upon the end of the shaft *e*, *e*, which carries a roller *f*, made of lithographic stone, zinc, or other suitable material, upon which the writing or other design to be printed is delineated in the ordinary manner. This roller *f*, drives (by friction of contact) a pressure roller or cylinder *g*, mounted upon a lever *h*, which is raised into the position shewn in the drawing by turning the cam *i*, by means of the handle *k*, for the purpose of giving the requisite pressure to the roller *g*. *l*, is a screw for regulating the amount of pressure given; and *m*, *m*, are two set screws, for the purpose of equalizing the pressure upon each end of the roller *g*. The printing roller *f*, is furnished with ink by a series of inking rollers *n*, *n*, *n*, mounted upon an endless belt or band *o*, *o*, passing over two drums or pulleys *p*, *p**, which revolve in suitable bearings attached to the frame *q*, *q*. The pulley *p**, is actuated by the spur-wheels, *r*, *r*, one of which is keyed on to the shaft of the pulley, and receives motion from the other wheel *r*, in gear with the wheel *d*. *s*, is a trough, containing the printing ink, which is furnished to the inking rollers *n*, *n*, by the roller *t*, worked by the ratchet-wheel *u*, and click *v*. This click *v*, is caused to take up one tooth at each revolution of the pulley *p**, by means of the excentric *w*, upon the end of the shaft of that pulley. The quantity of ink taken up by the roller *t*, is regulated by the doctor *x*, and it is afterwards evenly distributed over the surface of the rollers *n*, *n*, by their rolling upon the inking-slab *y*. The frame *q*, rests upon the excentrics 1, at one end, and upon the pivots 2, at the other end; so that the frame, and with it the whole of the inking apparatus, may be removed at pleasure.

If, at any time, it is found desirable to prevent the inking rollers *n*, *n*, from furnishing any ink to the printing roller *f*, the excentrics 1, must be turned upwards: the frame *q*, will thus be raised, and the segments *z*, upon the frame, will then support the pivots of the inking rollers *n*, *n*, causing them to pass over the printing roller *f*, in a curved line, without touching its surface. The printing roller *f*, is cleaned and damped after the printing operation (previous to receiving a fresh supply of ink); by means of a revolving "wiper" 3, formed of strips of linen or other fabric, set edgewise upon a roller in a longitudinal and slightly oblique direction. This "wiper" 3, is caused to devolve in the direction of the arrow, and has, at the same time, a reciprocating lateral motion given to it by the disc 4, set obliquely upon its shaft, working in the forked end of a lever 5, fixed to the framing. Thus, it is evident that the action of this "wiper" upon the printing roller, is similar to rubbing by hand with a cloth, but more equal and certain. The "wiper" 3, is kept clean and damp by the brush 6, which, as it revolves, dips into the water in the trough 7. There is also a contrivance for removing the "wiper" from and to the printing cylinder *f*, at pleasure. Having described the mechanical construction of his apparatus, the patentee proceeds to describe its mode of operation, which is as follows:—The paper, cloth, or other fabric to be printed upon, having been coiled in a long continuous strip or sheet upon the roller 8, is placed in front of the machine (or it may be cut into sheets of the required size, and placed upon the endless tympan-cloth 10), and the handle *k*, is raised into a perpendicular position, which, by means of the cam *i*, will allow the lever *h*, which carries the pressure roller *g*, to fall, and remove the pressure from the printing roller *f*. The frame *q*, carrying the inking apparatus, is then raised by means of the excentrics 1, and the machine is set in motion by turning the winch handle *g*, or otherwise, which will cause the wiper 3, to damp the roller *f*, at the same time causing the inking rollers to take the ink from the furnishing roller *t*. When the roller *f*, has thus been sufficiently damped, the paper is conducted by the workman over the endless tympan-cloth 10, which is distended over the bed-roller *g*, and tension-rollers 11, 11, 11. As soon as the end of the paper has come between the rollers *f*, and *g*, the lever *h*, is raised into the position shewn in the drawing, which will give the pressure required for printing; and the frame *q*, is lowered into the position shewn, thus allowing the rollers *n*, *n*, to furnish the ink to the printing roller *f*. The machine being thus put in working order, power is applied, either by turning the winch-handle *g*, or otherwise; and the machine may be worked without intermission, until the whole of the paper on the roller s, has passed through the machine. The paper, cloth, or other fabric, after receiving the impression, passes through the delivering-rollers *n*, into a basket or other suitable receptacle, and merely requires cutting into the proper lengths.—[*Inrolled in the Petty Bag Office, May*, 1846.]

Specification drawn by Messrs. Newton and Son.

To William Costen Aitken, *of Birmingham, in the county of Warwick, clerk of works, for a certain improvement or certain improvements in ornamenting cornices ends for cornice poles and other rods, curtain bands, and certain other articles.*—[Sealed 3rd June, 1845.]

This invention is divided into three parts:—the first part consists in ornamenting cornices, cornice poles, cornice ends for cornice poles and other rods, and curtain or cornice rings, by the application of plain or colored glass, enamel, porcelain, and other vitreous and semi-vitreous substances. In Plate XVIII., fig. 1, represents a pendant cornice end, constructed according to this improvement; fig. 2, is a cornice-end for an ordinary cornice or picture rod; and fig. 3, exhibits the mode of ornamenting cornices for beds and windows—the parts *a*, are of plain or colored glass, and the parts *b*, of metal. In applying this invention to cornices, the patentee sometimes makes the moulding (*c*, fig. 3,) of plain or colored glass, enamel, porcelain, &c. Figs. 4, show the mode of constructing curtain or cornice rings—the part *d*, consists of plain or colored glass, and the part *e*, is of metal. The part *e*, forms a lining or support for the glass ring, and serves also as a means of securing the loop *f*, to the ring; the stem of the loop being passed through a hole in the ring, and fastened to the metal lining.

The second part of the invention consists in ornamenting metallic and other bedsteads, couches, and chairs, by the application of plain or colored glass or enamel. Figs. 5, shew an elevation and vertical section of a bed-post, the parts *g*, of which are formed of plain or colored glass or enamel. This method of ornamenting is also applied to other parts of bedsteads, such as the foot and head-rails.

With respect to the last part of the invention, which refers to the construction of curtain bands or holders, wherein plain or colored glass, enamel, porcelain, and other vitreous and semi-vitreous substances are used, the patentee states that he is aware of such substances having been heretofore used in conjunction with metal, in the way of inlaying and such like modes of ornamenting, with a comparatively small quantity of glass or other like substance,—but according to his method, the curtain band may be made wholly of glass, enamel, &c., excepting a metal dovetail. Fig. 6, represents one of the improved curtain bands or holders,—the part *h*, is formed of glass, and the remaining portions are of metal. The metal dovetail *i*, is for the purpose of attaching it to the plate *j*. Metal is also occasionally introduced throughout the curtain band, but in such cases it is only used for the purpose of supporting or strengthening the parts which are made of glass, enamel, &c., or for more conveniently connecting the same. The form of the different parts, may be varied; and a bouquet holder substituted for the flower shewn at fig. 6.

The patentee claims, Firstly,—the application of plain or colored glass, enamel, porcelain, and vitreous and semi-vitreous substances to the ornamenting of the following articles,—that is to say, cornices, cornice poles, cornice ends for cornice poles and other rods, and curtain or cornice rings; whether the said glass, enamel, porcelain, and other vitreous and semi-vitreous substances be colorless or colored, or wholly or partially painted, or otherwise ornamented, as above described and shewn at figs. 1, 2, 3, and 4. Secondly,—the application of glass or enamel to the ornamenting of metallic and other bedsteads, couches, and chairs; whether the said glass or enamel be colorless or colored, or wholly or partially painted, or otherwise ornamented, as above described and represented at figs. 5. Thirdly,—the method of applying glass, enamel, porcelain, and other vitreous and semi-vitreous substances, to the ornamenting of curtain bands or holders; whether the said glass, enamel, porcelain, and other vitreous and semi-vitreous substances be wholly or partially painted or otherwise ornamented, as above described and exhibited at fig. 6.—[*Inrolled in the Inrolment Office, December*, 1845.]

[By a memorandum of alteration, dated January 23, 1846, the patentee disclaims such portion of his specification as relates to the ornamenting of curtain or cornice rings by the application of porcelain.]

To JOHN TAYLOR, *of Carlisle, in the county of Cumberland, miller, for certain improvements in flour mills, and in machinery connected therewith.*—[Sealed 6th June, 1846.]

THE object of this invention is to prevent the heating of flour (whereby its quality is deteriorated) when under the action of mill-stones and in the dressing cylinders. The first part of the invention consists in certain modes of introducing air between the stones of flour mills. In Plate XIX., fig. 1, represents in plan view, and fig. 2, in vertical section, an upper mill-stone, provided with a continuous opening, which is carried in a curvilinear direction round the eye B, of the stone, as indicated by the dotted line A, fig. 1, so that it shall exhibit the form of curve known as the volute; or, instead of one continuous opening of the volute form, a number of holes are made in the stone in such positions, that if a continuous line were drawn through their centres, it would describe a volute: the width of the openings and size of the holes will vary with the nature of the substances to be ground, such as wheat, barley, oats, Indian corn, &c. At different points in the continuous opening, as at *a*, *a*, or on the top of each hole, a deflecting cap C, is fixed, and bent over in the direction of the line of motion, so as to catch the air: the detached fig. 2*, exhibits a front view of the cap. The air thus deflected between the stones combines with the draft through the eye B, to produce what may be called a system of self-acting ventilation, which prevents the stones from becoming heated. The patentee states, that by this means the mill-stones can be kept with more face, and not only make better work, but grind from 10 to 15 per cent. more with the same power than such mill-stones as are in common use.

The patentee claims, under this improvement, making the opening in the upper mill-stone of the form of a continuous volute, or nearly so, or placing the holes substituted for such continuous volute (whatever may be the size or number of such openings) in such positions, that a line drawn through their centres would describe a continuous volute, and surmounting the said opening or openings with deflecting caps, bent over in the direction of the line of motion.

The second mode of introducing air between the stones of flour-mills is shewn at figs. 3, and 4,—fig. 3, being a plan view of the upper mill-stone A, and fig. 4, a vertical section of the same. B, B, are a series of funnel-shaped pieces, projecting above the upper surface of the stone, and attached to the ends of a corresponding series of pipes C, C, which lead to the eye E. These pipes may be flat, round, or of any other convenient form, and their funnel-shaped mouths are placed in such positions that a line drawn through their centres, as indicated by the dotted line, would describe a volute. The pipes C, C, are carried in a curvilinear direction from their mouths towards the eye of the stone, and are passed down the eye (still preserving the same curvilinear direction as much as is practicable) until they reach to within a short distance of the lower side of the stone, where they terminate in outlets D, bent backwards in the direction of the outer edge of the stone. The air is caught by the mouths B, B, of the pipes, and, by the rapid revolution of the stone, it is made to pass along the pipes C, C, by which it is conveyed between the mill-stones, and thereby prevents either the heating of the stones or the deterioration of the flour.

This invention consists, secondly, in a method of introducing air into the cylinders used in dressing flour. Fig. 5, is a vertical section, and fig. 6, a front view of the hopper of a dressing-machine. The air is introduced into the cylinders by an aperture F, situated near that part of the hopper termed "the shoe," which conducts the flour into the cylinders, so that a complete admixture of the air with the flour takes place as they enter the cylinder together.—[*Inrolled in the Rolls Chapel Office, December, 1846.*]

To Giacomo Silvestri, *of Naples, in the kingdom of Naples, physician, for certain improvements in preserving animal and vegetable substances from decay,—being partly a communication.*—[Sealed 7th April, 1845.]

The patentee commences his specification by stating, that for a long time past the thorough drying or dessication of organic bodies has been employed as the best mode of preserving them, and that the action of the preservative agents used, not only affected their shape, but when it did not quite dessicate the bodies by shrivelling them, it left a suppleness or elasticity which, in his opinion, prevented their perfect preservation. According to the patentee's mode of preserving, he avails himself of the preservative power without the deformative action of the matters heretofore used, by mixing with them other matters that will correct this action. The principle of the new process consists in the introduction, by the action of preservative agents, of some bodies, hard and solid, or capable of becoming solid, into the interstices, pores, and cavities which the organic bodies possess; these are more or less filled with matters capable of being decomposed by the action of the preservative agents, and such decomposable matters are replaced by the before-mentioned inert bodies; the presence of which, while it prevents the deformation of the organic bodies, assists their solidification.

The patentee describes the following mode of carrying out the invention; but other means of effecting the above object may be devised:—100 parts bichloride of mercury (corrosive sublimate), 100 parts powdered silex, 100 parts sub-carbonate of lime, 25 parts hydrochlorate of ammonia, 17 parts chloride of lead, and 17 parts chloride of zinc, are mixed together, pounded, and passed through a silk sieve; the mixture is then thrown into a vessel, lined with platinum, enamelled, or made of strongly varnished earthenware, and a sufficient quantity of water is added to form a sort of "syrup." In this bath the body to be treated is placed, care being taken that the liquor shall always cover it; and, for this purpose, a quantity of water equal to that evaporated is added when found requisite during the operation. To ~~effect a~~ more complete mixture of all the above matters, the bath may be slightly heated at first, and afterwards left to the atmospherical influence; but, according to the progress of the operation, the effervescence of the bath may be increased by adding some drops of sulphuric acid.

The length of time required for immersion varies; the human body generally takes 5 or 6 months, reptiles 2 months, molluscous animals 1 month, fishes 15 days, and insects 5 or 6 days; but the operation will also vary according to the degree of hardness required. It will be easy to ascertain when the operation is completed, as fishes and insects will fall to the bottom, by reason of their increased weight; and, with regard to other bodies, the state of preparation may be ascertained by striking them slightly, when in the bath, with a stick, and the sound emitted will be in proportion to the solidity they have acquired. The object of the bath is to introduce hard bodies into the pores and into the cavities of the matter of organic bodies, but the large natural cavities of the bodies cannot be filled by the preparation composing the bath;—to preserve the shape of a fish, the patentee places in the interior some solid substance in a state of powder, as sulphate of lime, or any other substance with which the preservative liquor will enter into combination. The process already known and used for the preservation of bodies may be employed in conjunction with the above mode of obtaining a complete solidification. The position of the body after being solidified will depend upon its position in the bath, and when once immersed, it must not be again touched until the operation is complete. The body is suspended in the vessel to prevent its shape being altered by the increase of its weight, and to allow the solution to penetrate on every side. The above described treatment will impart to the body a hardness equal to hard wood, and some bodies will become as hard as stone, and capable of receiving a fine polish.

When the immersed body has attained the required degree of solidification, it is taken out of the bath, and washed with alcoholized water; it is then dried by the use of some powder capable of absorbing the dampness, or by unsized paper, or rags, or by means of a moderature temperature; and is afterwards varnished with diluted gum-arabic, or such like non-coloring varnish. To prevent any discoloration of the body, the patentee, after taking it out of the above bath, immerses it in a second one, composed of 50 parts hydrochlorate of soda, 50 parts phosphate of soda, and 100 parts pounded silex, to which may be added some salt of alum, to prevent the fatty matters of the body passing through the skin; and as a further preventive of discoloration, he sometimes puts into the second, as well as into the first bath, some cinnabar or other coloring substance, agreeing with the shade which cannot be entirely preserved. The body remains in the second bath from eight to ten days, and is then subjected to the drying and finishing operations above described.

The process of solidification may be accelerated by injecting the preservative liquor, by means of syringes; but this mode of operating requires care and attention to the effects of the liquor, in order to regulate the injections, which must be continued until a perfect solidification has been produced; and in this case, also, the body must be kept completely immersed, as otherwise it would not be preserved from the effects of decomposition, or, at least, from the alteration of some of the external parts. Although the process by immersion is slow in producing a perfect solidification, it ensures the preservation of the body, in whatever state it may be when immersed in the bath: thus, supposing decomposition to have begun, it is immediately stopped; but the subsequent solidification does not remove the traces of the decomposition.

The vegetable substances which the patentee proposes to preserve are leaves, flowers, and grasses. The preservative material employed is prepared by mixing with any quantity of powdered silex, one-thirtieth of its weight of sulphate of ammonia, also in powder; a layer of this mixture is deposited in a glass or earthenware vessel, and upon it is placed the leaf, flower, or grass, which is then carefully covered with another layer of the mixture; and the patentee introduces with a spatula or other instrument, as much as possible of the mixture into the internal parts of the plant. The vessel is placed upon some sand, slightly heated, which is to be kept at the same degree of temperature for five or six days, when the operation will be complete: the plant being then taken from the vessel is lightly shaken, and, by means of small iron pincers, or other suitable instruments, any part of the plant which may have been disturbed during the operation is replaced in its proper position.

The patentee claims, Firstly,—the introduction of hard substances into the cavities of organic matter by means of liquids; and the mode in which the same is to be introduced. Secondly,—the rendering available the preserving and obviating the deforming action of certain agents, by uniting them with the substances which will correct such deforming action, as above described. Thirdly,—the preserving leaves, flowers, and grasses, as above described.—[*Inrolled in the Petty Bag Office, October*, 1845.]

To JOHN BLYTH, *of Saint Anne, Limehouse, in the county of Middlesex, engineer, for an improved mode of closing the orifices of bottles or other vessels, applicable to ink-holders.*—[Sealed 28th May, 1846.]

THE improved mode of closing the orifices of bottles or other vessels consists in the employment, for that purpose, of an internal flap, valve, or door, acted upon by a spring, counterweight, or float, which presses it into close contact with the internal edge of the orifice, so as to close the same; and this flap, valve, or door, may be opened by pressure upon its exterior, but will instantly close again on the pressure being discontinued.

The application of this invention to ink-holders, is exhibited in Plate XX. Fig. 1, is a plan view of the bottle or other vessel; fig. 2, is a vertical section of the same, shewing the flap, valve, or door, in a closed state; and fig. 3, is a similar section, shewing the mode whereby the valve is opened, in the act of dipping the point of a pen into the ink. *a*, is the bottle or vessel, made of horn, glass, porcelain, metal, or other suitable material, and having an aperture in the upper part, into which a ring *b*, is fitted. *c*, is the flap, valve, or door, which is borne upwards against the internal edge of the ring *b*, (so as to close the opening), by the action of a helical spring *d*, situated beneath the lower end of a moveable vertical stem *e*, the upper end of which is rounded, and enters a cavity in the under side of the valve. When any sufficient external pressure is applied to the upper part of the valve *c*, (as, for instance, by means of a pen, in the manner represented at fig. 3,) the spring *d*, will yield, and allow the stem *e*, and valve *c*, to descend so much as to open or partially open, the orifice in the ring *b*; but when such external pressure ceases, the reaction of the spring will cause the valve to close the orifice. The helical spring *e*, is contained in a small tube, that passes through a hole in the dome-shaped bottom of the vessel; the tube having a flange at the top, which rests on the upper surface of the dome, and being retained in its proper position by means of a nut *f*, screwed on the lower end—collets of leather, India-rubber, or other suitable packing, may be applied beneath the flange of the tube, and above the nut *f*, to make a close joint. The stem *e*, passes through a hole in the centre of the flange, and there is a projecting head at its lower end, fitting the interior of the tube; so that the stem, although quite free to move up or down endways, is retained in the intended vertical position beneath the centre of the valve *c*. The ring *b*, valve *c*, spring *d*, and stem *e*, should be made of silver, gold, platina, or other metal, or material, or compound thereof, which is not liable to be corroded by the ink. The bottle or vessel, above described, will be suitable for holding oil for the use of watchmakers or other artificers, as small dips of oil can be taken out, by inserting a small broach, bodkin, or pin, into the vessel, and the oil will be kept clean.

The construction of the valve *c*, spring *d*, and stem *e*, may be varied. For instance, the valve *c*, may be attached to the ring *b*, by means of a hinge-joint; and, instead of the helical spring *d*, and stem *e*, a flat blade-spring may be substituted, such spring being applied in the position shewn by the dotted line *z*, fig. 2, with one of its ends fastened to the ring *b*, and the other end turning up with a blunt or rounded point, beneath the cavity at the centre of the valve *c*. When the valve *c*, is attached by a hinge-joint, it may be of a square or oblong figure, instead of circular; and it may be applied in a vertical or inclined position. Fig. 4, is a section of an ink-holder, having the flap or door in a vertical position: the aperture in the upper part of the vessel *a*, is surmounted by a box *g*, within which the flap or door *c*, is applied, in order to close an orifice at one side of the box; the flap or door being suspended on a hinge-joint at the upper part, and kept closed by the action of a slender spring *h*, which will yield on the pen being pressed against the flap, and permit the flap to open. In place of employing such spring *h*, or, in addition thereto, a small metal counter-weight *i*, may be fastened to the inside of the flap, as shewn at fig. 4, in order to impart to the flap the requisite tendency to close. And instead of the helical spring, or the flat spring above-mentioned, a small bag or bladder of India-rubber, filled with air, may be applied beneath the valve *c*, the air-bag having a small shield on its under side, which rests on the upper end of a fixed stem. Or, in place of using an air-bag, the natural elasticity of India-rubber may be taken advantage of, by placing a piece of it beneath the valve *c*, and permitting it to rest on the top of the stem. A spiral wire spring might be fastened by its outer end to the under side of the valve *c*, near to its circumference, with the spiral coils within the concavity thereof; the inner end of the said spring carrying a small inverted cup beneath the centre of the valve, in a suitable position for resting on the upper end of a fixed stem. When a counter-weight is used instead of a spring, for closing a horizontal valve, such as *c*, figs. 2 and 3, it may be applied at one end of a lever (within the bottle or other vessel), the fulcrum whereof is situated beneath the circumference of the ring *b*, and the other end of the lever terminates in an upright stem, upon which the valve rests.

When a float is used for closing the valve, it may be a ring or disc of cork, coated with India-rubber varnish; or it may be a hollow float of very thin glass, or metal, or India-rubber, adapted to float on the surface of the liquid contained in the vessel, or it may be submerged beneath that surface, being, in either case, connected by radial arms, or otherwise, with a moveable upright stem, which supports the valve. Fig. 5, is a vertical section of an ink-holder, exhibiting the application of a float; and fig. 6, is a plan view of the float. The bottle or other vessel *a*, with its ring *b*, valve *c*, and stem *e*, are all the same as above described; but the stem *e*, instead of sliding vertically in a central tube, is fastened to the central part of the radial arms *j*, *j*, of the float *k*. The float is formed of cork, or other suitable buoyant substance, and is submerged beneath the surface of the liquid; its exterior is nearly of the same size as the interior of the vessel *a*, so that the float, and, consequently, the stem *e*, will keep in the proper position, although left free to rise and fall. The float may be made in two, three, four, or more parts, each having a radial arm *j*, fastened to it, and each part, with its radial arm, being of a suitable size to be introduced through the aperture in the top of the vessel *a*; the several parts, when so introduced, will fit together, with their radial arms overlapping one another at the common centre, so that a screw at the lower end of the stem *e*, can be inserted into the central holes of the arms, and thus unite the whole of the parts together.

A central vertical tube, for the reception of the stem *e*, and helical spring *d*, may be formed of the same material and in one piece with the vessel *a*. If the vessel *a*, be made of glass, the lower end of the tube may be united to the bottom when the glass is in nearly a melting state: or if the vessel be formed of porcelain or pottery, the union is to be effected previous to the firing or burning of the material.

In conclusion, the patentee states, that his invention consists in the application, in the manner hereinbefore described, of an internal flap, valve, or door, to close the orifice of a bottle or other vessel, and to keep the same closed by the reacting force of some suitable kind of spring, or counter-weight, or flater, which is suitably applied, as hereinbefore described, for urging the said flap, valve, or door, outwards from within the bottle or other vessel towards the orifice thereof, so as to close the same, and so as that the said internal flap, valve, or door, can be very easily opened by pressure against the same from without; but nevertheless so as to be instantly closed again on cessation of such external pressure, in consequence of the said reacting force, without requiring any manipulation for effecting the intended closing, and which improved mode is applicable to inkholders.—[*Inrolled in the Rolls Chapel Office, November,* 1846.]

To Zachariah Major Parkes, *of Peckham, in the county of Surrey, surveyor, for improvements in the manufacture of coffins for the dead.*—[Sealed 22nd May, 1846.]

These improvements in the manufacture of coffins for the dead relate to the substitution of certain materials for those heretofore used in constructing coffins, whereby the escape of noxious effluvia arising from the decay of human bodies will be prevented; and coffins, which will be unaffected by time, can be produced at about the same cost as when sheet-lead is employed.

The first part of the invention consists in employing, for the manufacturing of coffins, plate-glass and flint-glass, or other vitrified substances possessing similar properties of durability. The second part of the invention consists in the application of what is generally termed "earthenware" to the like purpose.

When employing plate-glass as the material for forming coffins, the patentee proceeds as follows:—He first prepares a mould of cast-iron, or other suitable material, of the requisite form and size; the sides and ends are made loose, so as to be capable of removal at pleasure, and the bottom consists of a large polished plate. He then provides a large core of the same material as the mould, and made hollow for the double purpose of forming the coffin, and absorbing sufficient heat from the glass to prevent the glass, when poured out of the pots or other vessels, from "flying" or "cracking." The glass is taken in the pot and poured into the mould, and the core being instantaneously inserted, pressure, obtained from any hydraulic press, or by other approved means, is applied to force the glass up the sides of the mould and form the coffin. Near the upper edge of the sides and ends of the mould a rabbet or recess is to be formed, for the purpose of receiving the lid. In order to form the lid, another mould, of a suitable shape, is provided, into which the glass or metal is poured, and a roller is passed over it, so as to form a flat plate of the form and thickness required. The lid thus produced is intended to fit into the rabbet or recess made in the upper edge of the body of the coffin, as above stated, and be hermetically sealed thereto. When the body and lid of the coffin are thus formed, they are to be annealed in a lear or kiln, as the case may be.

In some instances the patentee employs pieces of plate-glass as a lining for wood coffins, in place of lead. The glass is cast in sheets, in the ordinary manner, and cut to the required form; the pieces are then attached together by any suitable cement, capable of withstanding the action of moisture, by which means air-tight joints will be obtained. The cement preferred is composed of borax and powdered glass, melted and run together; but any other enduring cement may be employed, as found convenient.

When the coffins are constructed of flint-glass, the patentee pursues the same mode of manufacture as stated for plate-glass, except that the pot itself cannot be used to pour the metal in the mould, but the glass must be taken out of the pot in ladles, and poured into the moulds. The glass must be used at an intense heat, and subjected to the same process of pressing as stated for plate-glass.

The coffin lid should be small enough to admit of a sufficient quantity of cement being inserted between the edges and the rabbet or recess in the upper part of the coffin, so as to make an air-tight joint and hermetically seal the coffin.

Before finally closing the coffin, the air is exhausted from the interior by means of a spirit lamp or any other similar contrivance.

In manufacturing coffins of china, earthenware, and stoneware, the patentee constructs them of several pieces. After the clay or other similar plastic material has been prepared in the usual manner for producing earthenware articles, the several portions are formed in moulds, and the several pieces are subsequently united by any imperishable cement. The shape of the upper edges of the sides and ends, and the mode of affixing and sealing the lids are the same as specified for the glass coffins. When thus constructed, the coffins are burnt and glazed, as is usual in the manufacture of china, earthenware, and stone-ware articles. The name of the deceased may be written and burnt on the lid previous to glazing, if thought desirable.

The glass coffins formed by casting, and also those made of earthenware, may be enclosed in a wooden shell, as is at present the practice with respect to leaden coffins.

The patentee wishes it to be understood, that he does not intend to claim the exclusive use of glass or vitrified substances, however employed, in the manufacture of coffins, as glass has before been proposed to be used as an inner lid for coffins. But he claims, under the first head of his invention, the several methods above described for obtaining an air-tight coffin, which will retain the effluvia arising from a decomposed body contained therein, and resist the action of damp and other promoters of decay. Under the second head, he claims the constructing of coffins from clay or other burnt earth, as above described.—[*Inrolled in the Petty Bag Office, November*, 1846.]

Specification drawn by Messrs. Newton and Son.

To DOMINIC FRICK ALBERT, *of Manchester, in the county of Lancaster, operative chemist, Doctor of Laws, for his invention of an improved application of materials to the manufacture of soap.*—[Sealed 28th June, 1845.]

THIS invention consists in saponifying fresh gelatinous animal matters obtained as offal from slaughtered animals: this offal includes all such refuse matters as are not already applied to any industrial purpose, and are generally used as manure with the inorganic matters which they contain. These fibrous tissues must be collected as soon as possible after their separation from the body of the animal, and their contents being carefully washed out, they are immersed in a trough or reservoir of cold water for a few days;—running water is preferable, but when this advantage cannot be obtained, the water must be changed twice a-day. In summer, or when these substances are not quite fresh, they should be scalded with hot water after cleansing, and before immersion in cold water. The object of this maceration is, to bleach these matters, and also to facilitate their dissolution in the lees. When taken out for saponification, the water must be pressed out of these matters; and for every seven pounds of animal substance, one pound of liquid caustic soda, at thirty-five degrees Beaumé, is employed. These ingredients are thrown together into the pan, which should either be heated by steam, or great care taken during the boiling to avoid the carbonization of the animal substance. After the saponification has taken place, some resin dissolved in caustic soda lees may be stirred into it, to increase its lathering properties; and a small proportion of any greasy substance added to it will reduce its gluey nature, before it is emptied into the forms, where the paste is to be "crutched," till it begins to stiffen.

The patentee claims as his invention, Firstly,—the application, employment, or use of fresh animal gelatinous offal to produce a soap, instead of oil or grease; and, Secondly,—the preparation of this offal, as above described.—[*Inrolled in the Petty Bag Office, December,* 1845.]

Specification drawn by Messrs. Newton and Son.

To Isaac Hawker Bedford, *of Birmingham, in the county of Warwick, for improvements in the manufacture of window and other glass,—being partly a communication.* [Sealed 12th December, 1845.]

This invention consists, firstly, in certain improvements in staining sheet-glass, and vessels and other articles made of glass; and, secondly, in improvements in etching sheet-glass, and vessels and other articles made of glass. That part of the invention which relates to staining glass, has for its object the use of copper in staining articles made of glass, so as to produce a red color. The sheet-glass, and vessels or other articles of glass, are to be made in the usual way; and when articles of cut-glass are to be stained, they may be stained before or after cutting and polishing, and the staining may cover the whole or any part or parts of the surface. It should, however, be remarked, that this part of the invention is performed most successfully with those descriptions of glass which are made without the use of soda. The articles of glass being made, and their surfaces well cleaned, they are treated in the following manner:—One part by weight of sulphuret of copper, two parts of the scales of iron obtained from a smith's forge, three parts of sulphate of copper, burned to whiteness, and four parts of calcined yellow ochre, are ground as finely as possible with the essence of turpentine; and it is advisable to mix with such turpentine a small quantity of the essence of turpentine that has become rather thick by long exposure to the atmosphere, which prevents the mixture chipping off after becoming dry on the glass. The mixture, thus produced, is of the consistency of cream, and is laid on to the surface of the glass with a brush, and allowed to dry. The articles of glass are then placed in an ordinary stainer's muffle, and heated to as high a degree of heat as the glass can be subjected to without melting; after which, the fire is drawn off, and the articles of glass are allowed to cool down slowly. When cold, the articles are to be washed; and then, on looking in a direction edgewise of the glass, it should present a greenish-yellow appearance if lead has been used in the making of the glass:—the color obtained will differ according to the composition of the glass. The articles of glass are again placed in a muffle, and again heated to the degree above mentioned; then the fire is withdrawn, and a quantity of small coal is introduced into the lower part of the muffle: for this purpose it is convenient to have the cover of the muffle in two parts, so that a small part of the cover at the lower part of the muffle may be removed to allow of a shallow tray being slidden into the muffle under the articles of glass placed on the perforated shelves above. The quantity of coal introduced into a muffle twenty-four inches in diameter and thirty inches in length, is four pounds; and then the muffle is completely closed and luted, by which means the products of the coal are prevented from escaping. The muffle and the articles of glass are allowed to cool down, and when cold, the articles of glass are taken out; and they will generally be found to offer a brownish-red color, on looking through them. The articles that exhibit this color are then to be placed in another muffle (which has been lime-washed), and again heated up to the same degree of heat as before mentioned; the fire is to be removed, and the muffle and the articles of glass cooled down; and, when cold, the articles of glass should present the red color desired.

It should be stated, that a red color, of the depth and tone desired, is not at all times obtained by going once through the process above explained; in which cases the articles are again and again to be subjected to the same processes. A workman will, however, with care, after some experience, be able to judge whether the effect desired has been obtained by each part of the process, and if not, he will not carry such articles through the remainder of the process, but will repeat the previous part or parts of the process, till the appearance desired has been obtained. The patentee does not confine himself to the exact details of the above process, so long as copper is used when staining articles made of glass, so as to obtain a red color.

In carrying out the second part of the invention, which has for its object the ornamenting of glass by a peculiar process of etching—the patentee grinds five parts of puce-colored oxide of lead (peroxide) and one part of flux (the flux employed consisting of 17 parts glass of borax, and 13 parts red lead, fused together) with turpentine; and with this composition the artist paints the desired devices or designs on to the surface of glass to be etched;—when colored glass is to be etched, the patentee prefers to use acetate of lead, in place of the oxide of lead above mentioned. The articles are then allowed to dry, and are fired in the same manner as when gilding on glass; after which, the articles are permitted to cool, and when cold, they are dipped in a weak solution of nitric acid in water; and so soon as the painted designs are acted on, the articles are placed in water and the surfaces cleansed by rubbing off the preparation above mentioned. The patentee does not confine himself to the exact details of the above process, so long as lead is used and removed by acid.

The patentee claims, Firstly,—the mode of manufacturing stained window or other glass, by applying copper for producing a red color for staining the same on the surfaces, as above described. And, Secondly,—the mode of manufacturing window and other glass, by etching on the surfaces thereof by means of lead acted on by acid.—[*Inrolled in the Inrolment Office, June,* 1846.]

To HAROLD POTTER, *of Darwen, in the county of Lancaster, paper-manufacturer and stainer, for improvements in printing or staining paper.*—[Sealed 1st April, 1846.]

THIS invention consists in a mode of supplying color to the surface-rollers used for printing or staining paper.

In Plate XIX., fig. 1, is a vertical section of an apparatus for supplying color to the surface-roller of a machine for printing or staining paper; this invention is applicable where several colors are to be printed from the same roller, and also in cases where the paper is to be printed with stripes of the same color. *a*, is the surface-roller, and *b*, an endless blanket or sieve-cloth, for supplying it with color; the endless blanket is supported by rollers *c*, *c*, and is caused to move at the same surface-speed as the roller *a*. The color is applied to the endless blanket by a hand-block *d*, furnished with several rows of studs or projections *e*, which enter into the color-trough *f*: this trough is represented in the sectional view, fig. 2, as being divided into seven compartments, which may contain seven different colors. The operator dips the studs or projections of the hand-block into the color, and then transfers the block to the endless blanket, whereon it is spread by a bar *g*, covered with woollen cloth, which is slightly pressed against the endless blanket or sieve-surface, and any excess of color is removed by the doctor *h*.

The patentee says he is aware that endless sieve-surfaces have been used for supplying color to rollers when printing calico and other fabrics; he does not therefore claim the same, nor does he confine himself to the details shewn; but he claims the mode of supplying surface-rollers, used for printing or staining paper with colors, by an endless sieve-surface, as above described.—[*Inrolled in the Inrolment Office, September,* 1846.]

To TIMOTHY KENRICK, *of West Bromwich, in the county of Stafford, iron-founder, for improvements in glazing and enamelling the surfaces of cast-iron.*—[Sealed 26th May, 1846.]

THIS invention consists in glazing and enamelling the surfaces of certain cast-iron articles. The vessel of cast-iron required to be glazed and enamelled, must first be well cleaned; it is then ready for the application of the enamel, which is composed of two coats, one forming the body, and the other producing the glaze. The first composition is made by fusing 100 lbs. of calcined flints, ground to fine powder, with 75 lbs. of finely-pulverized borax, and then grinding 40 lbs. of this mixture with 5 lbs. of potters' clay, in water, until it is brought to such a consistence that when the cast-iron vessel is dipped into the composition, it will receive a coating about one-sixteenth of an inch thick. As soon as the coating, thus applied, has become set, and while it is yet moist, the second composition, which is in a finely-pulverized state, is sifted over it. The second composition is formed by mixing together 100 lbs. of Cornish stone, ground to a fine powder, 117 lbs. of finely-ground borax, 35 lbs. of soda-ash, 35 lbs. of saltpetre, 35 lbs. of sifted slaked lime, 13 lbs. of white sand, and 50 lbs. of well-pounded white glass, and vitrifying the mixture; when cool, it is ground very fine in water, and afterwards dried; 45 lbs. of the powder and 1 lb.

of soda-ash are well mixed in hot water, by stirring; and the mixture being then dried in a stove, a fine powder is produced, which constitutes the second composition. When this powder has been very evenly sifted over the first composition, the cast-iron article must be put into a stove, kept at a temperature of about 212° Fahr., in order to dry the composition; after which, the composition is fired, by placing the article in a kiln or muffle, kept at the temperature requisite to fuse the glaze. If the article is found to be imperfectly glazed, when withdrawn from the kiln, some of the glazing composition is again sifted over it, and it is replaced in the kiln until the glaze is fused.

For coating the inside of iron pipes, over which the glaze-powder cannot be conveniently sifted, on account of their length or small diameter, the patentee proceeds in the following manner:—When the inside of the pipe has been cleaned, he pours the first composition through it, turning the pipe round at the same time, to insure an even coating upon every part: after this has become set, he pours the second composition through in a similar manner, and then fires it in a kiln, as above-mentioned.

The patentee, in concluding his specification, says that the interior surfaces and rims of cast-iron vessels have been heretofore enamelled and glazed by the application of two coatings, one for the body, and the other for the glaze. He therefore claims, Firstly,—the enamelling and glazing, in the manner above described, of the exterior surfaces only of such vessels of cast-iron. Secondly,—he claims the enamelling and glazing of cast Italian-irons, cast box-irons, and cast-iron knobs for doors and other purposes. Thirdly,—the enamelling and glazing of the inside of such cast-iron pipes as aforesaid. And, Lastly,—the enamelling and glazing of ornamental surfaces of cast-iron.—[*Inrolled in the Inrolment Office, November,* 1846.]

To Arthur Philip Perceval, *of East Horsley, in the county of Surrey, clerk, for improvements in communicating between places separated by water.*—[Sealed 23rd April, 1846.]

This invention is described by the patentee in the following peculiar manner:—" First.—When the electric wire or wires has or have been effectually secured from water, whether by alternate layers of thread and gum (caoutchouc or any other), or by any other flexible processes, enclose the whole in a necklace of iron rings, in contact with each other, or of iron sockets, dovetailing one into the other. Coil it on the deck like any other cable, and throw it overboard in transit.

" Note *a.*—When less than two wires are so enclosed, surround the necklace with a spiral cord.

" Note *b.*—The substance of the necklace may vary, according to the nature (hard or soft, rough or smooth) of the bottom on which it has to lie.

" Second.—When this means of communication is unavailable, transfer the apparatus for conveying signals used in the semaphores on land to hulls, circular, polygonal, or ordinary, and fix them at proper distances, securing them, when necessary, by mushroom anchors. The hulls, in all cases, to be of sufficient size to afford accommodation for the men necessary to work the signals, and, when desirable, to be fitted up as floating batteries."—[*Inrolled in the Inrolment Office, October,* 1846.]

To Nathaniel Chappell, *of Arcadian-Villa, Cumberland-road, in the county of Bristol, Gent., for improvements in the manufacture of worts.*—[Sealed 20th November, 1845.]

The object of this invention is to obtain a greater quantity of material capable of being converted into saccharine matter, from malt, barley, and other articles, than can be procured by the ordinary processes.

When the worts are to be obtained from malt, the malt is mashed in the ordinary way with water, at a temperature of from 145° to 150° Fahr. (care being taken that it shall not, under any circumstances, exceed 167°), for the usual time, and the liquor or product, containing nearly the whole of the "diastase," and also the saccharine matter, is then drawn off through a strainer; after which the "grains" are steeped again in a closed vessel, and subjected to the action of a much higher degree of heat than has been the case heretofore; and when they have been steeped for a sufficient time, the liquor is drawn off: this steeping is repeated as often as may be considered requisite, and then the first and subsequent products, which have been kept at a temperature of 160° Fahr., are mixed together. By this process, a greater quantity of saccharine matter is obtained than by the usual processes.

Or, instead of the above, the following method may be adopted, particularly when other materials are used in addition to malt:—All the materials, except the malt, are subjected, in a closed vessel, to the higher degree of temperature before-mentioned, and, after a suitable time has elapsed, the liquor is drawn off through a strainer; the temperature of the liquor is then reduced to 160° Fahr., and the malt, in a finely-ground state, is introduced and mashed with this product, instead of water. The grains from the malt, thus treated, may subsequently be operated on in the same manner as the grains in the former instance, and the whole of the convertible matter will be thereby extracted.

In carrying out this invention, the patentee uses a strong copper vessel containing a coil of pipe for the passage of steam or water, and surrounded by a jacket or steam-case; it is also provided with a steam-pipe for introducing free steam into the vessel, and a stirrer for turning over the malt. Into this vessel six gallons of water at 160° Fahr. are introduced for every twenty pounds of malt employed, and then the malt is stirred in, which will reduce the temperature; but the temperature is to be maintained at about 150° for one hour and a half, by the admission of hot water into the jacket and coil of pipe. The product is then drawn off through a strainer into another vessel, in which the temperature can also be kept at 150°, and it is covered over, to exclude the atmosphere: this product is similar to the first product obtained by brewers, and contains the greater part, if not the whole of the diastase previously in the malt, and also the saccharine matter. Instead of now continuing the process as heretofore practised, by employing further quantities of water, usually at from 160° to 180°, and never exceeding 212°, he applies and maintains such higher degree of heat as will more effectually dissolve the starch in the grains. He first introduces a quantity of hot water equal to about one-third of that which was before used (stirring it and the grains), and secures the cover upon the vessel; steam is now allowed to flow into the vessel, until a temperature of 250° is obtained (the stirrer being kept in motion); the steam is then shut off from the interior of the vessel, and only allowed to flow into the coil of pipe and the jacket, so as to maintain the heat of the grains and water in the vessel at 250° for two hours; at the expiration of which time, the steam is shut off from the coil of pipe and jacket, and cold water is introduced instead thereof, to cool down the matters in the vessel to 160°; then the product is drawn off through a strainer and kept at 160° (or it may be drawn off in the more highly-heated state, and cooled down to, and maintained at, 160° in the vessel which is to contain it), until it and any future product is mixed with the first product. Hot water is again added to the grains in the vessel, and they are subjected to a high temperature, as above described, in order to extract any starch which may still remain undissolved; the temperature is then reduced to 160°, and the product drawn off through a strainer: this process is again repeated, if found necessary. The first product, containing the diastase, is now mixed with the products from the grains, at a temperature of about 160°, and the combined liquids are kept heated to 160° from three to four hours, to ensure a complete conversion of the whole of the starch: by this means a much larger quantity of saccharine matter is obtained from malt by the diastase therein converting a larger quantity of starch, obtained as above described, than by the process heretofore employed. The saccharine matter being thus obtained, the manufacture and application of worts is to be carried on as usual.

The patentee states, that although he has only mentioned malt as the material used in the above process, in order to point out how the largest results may be obtained therefrom, he employs ground barley when operating on the grains, using three, four, or more times as much barley as malt;—starch from other matter may be obtained and dealt with in like manner. Instead of extracting the first product from malt, as above mentioned, a solution of starch may be obtained from other matters, by subjecting them to a high temperature; and then the product having been reduced to 160°, ground malt may be stirred in, as if making a first mash, by which the liquid will be saccharified, and may then be drawn off through a strainer: the grains resulting from such process may be further treated with ground barley or other matter to obtain the starch therefrom.

The patentee claims the mode of manufacturing worts by the application of a higher degree of heat than hitherto applied, so as to obtain an increased quantity of material capable of being converted into saccharine matter, and afterwards converting the same by the application of the "diastase."—[*Inrolled in the Inrolment Office, May,* 1846.]

REPORT OF AMERICAN PATENTS.

From the "Journal of the Franklin Institute."

BY MR. C. M. KELLER.

To JOHN BLISS *and* FREDERICK CREIGHTON, *of New York, for an improvement in watches, chronometers, &c.*

CLAIM:—"We do not claim to have invented any of the parts herein described, as all are already in use, and well known; neither in our arrangements, as above described, do we claim to have obtained any results not contemplated or sought for by others; our claim being only for obtaining an increase of equality in the performance of watches, chronometers, and other time-pieces—first, by the mode we have described and shewn of forming the balance rim with quarter-circles, arches, or segments, each way from each end of the arm, instead of a half-circle from each end in opposite directions; and, secondly, by the application of a second balance-spring above, below, or inside the single balance-spring heretofore in use, substantially as the same are described.

To F. C. Curtis, *of Columbia, South Carolina, for an improvement in harness, collar, and hames.*

Claim:—"What I claim as my invention, and desire to secure by letters patent, is the combination of a bow of wood, to fit the neck of a horse or mule, with the mode herein described of ironing and padding the same, so as to constitute the harness, collar, and hames, all complete in one."

To a wooden bow, properly formed and padded (except one face), are attached the draft-rings, trace-hooks, and, in short, all the parts usually belonging to the hames; and the upper ends of this bow, extending above the horse's neck, are connected together by a strap which, when loosened, and the chafe-leather removed, permits the bow to open sufficiently to be removed from the horse's neck.

To T. A. Robertson, *of Georgetown, D. C., for improvements in the machine for cutting shoe-pegs.*

The patentee says:—"The nature of my invention consists in adding to the knife which splits off the rows of pegs small knives set in front of the large one, and at right angles thereto, at the distance of a single peg apart, so that as the row of pegs are split off, each individual peg shall be separated from the rest, thus perfecting the whole at one operation."

Claim:—"What I claim is the combination of the knife (the long knife) with the short knives placed at right angles thereto, for splitting the pegs both ways—the whole being combined with the fluted roller, as before specified."

To William Blake, *of Boston, Massachusetts, for an improvement in the gas-burner.*

Claim:—"I claim the combining with the space directly beneath the orifices of discharge of the gas, and with the supply or branch tubes, an expansive chamber, so as to operate in the manner and for the purpose hereinbefore set forth.

"I also claim making the lower part of the inner cases of the burner with a bell-shaped opening or mouth, in the manner and for the purpose as above specified."

The object of the chamber is to permit the gas to expand, and thus to keep a regular supply at the discharge orifices; and the object of making the lower part of the case of the burner bell-mouthed, is to make the area at the bottom greater than at the top, where the combustion takes place.

To Dionysius Lardner *and* James Davidson, *of New York city, N. Y., for an improvement in the apparatus for impregnating meats, &c., with brine.*

Claim:—"We claim as our invention, the manner herein described, in which we have arranged and combined the respective parts of the apparatus for salting or impregnating provisions with any desired solution, as set forth; that is to say, we claim the combining of a common lifting-pump, and of a force-pump, with the vessel and with the cistern, substantially in the manner and for the purpose herein fully made known."

The provisions to be impregnated are placed in the vessel, the brine is then introduced from the cistern above through the bottom, which expels the air through a valve at the top; the cock which admits the brine at the bottom is then closed, and the brine pumped out of the vessel by the suction pump, thus leaving the provisions in a vacuum: the brine is then again admitted. The force-pump is used at first to expel the air by forcing in the brine, but this is not required afterwards.

To SOLOMON F. FINCH *and* JAMES WHEELER, *of Rootstown, Ohio, for an improvement in the machine for cutting laths.*

CLAIM:—"We are aware that machines for cutting laths have been made with a carriage to carry the bolt or block against the edge of a knife, and that the bolt or block has been griped preparatory to and during the operation of cutting, in machines in which the knife is carried against the bolt, instead of the bolt against the knife, and the bolt liberated before the knife has been moved back clear of the bolt; and hence we wish it to be clearly understood, that we do not claim to be the original and first inventors of these; but what we do claim as our invention is, making the carriage which carries the bolt or block to the knife in two parts, moving on each other, and connected together by a spring, or analogous device, so that the bolt is griped whilst being carried against the edge of the knife, and still griped until drawn back from the edge of the knife, and then liberated, for the purpose and in the manner substantially as herein described."

To BERIAH SWIFT, *of Washington, New York, for improvements in the mill for grinding bark, coffee, &c.*

CLAIM:—"What I claim as my invention, and desire to secure by letters patent, is making the grinding teeth of mills in concentric rows, projecting from the surface of the plates, so that the teeth of one plate shall run in the spaces between the teeth on the other, and *vice versâ*, in combination with the grooves or furrows running towards the periphery of the plates, through which the substances acted upon are carried outwards, whether these furrows be arranged radially, according to what is technically termed the eight-quarter dress, or in any other manner, leading from the inner to the outer range of teeth.

"And I also claim, in combination with the teeth, arranged as expressed in the above claim, the breaking teeth on a cylinder or cone, arranged substantially as herein described and for the purpose specified."

The teeth covered by the first section of the claim are arranged on discs, and at the centre of the runner there is a cone or cylinder with large teeth, for breaking the substance to be ground by the teeth on the disc; this breaking part is covered by the second section of the claim.

To HARVEY W. SABINE, *of Rushville, New York, for an improvement in the washing machine.*

IN this machine the clothes are washed by the action of a pounder or piston that presses them against the end of a square box or tub, and to increase the force with which the pounder strikes the clothes, the handle has a slot in it, with a roller that acts on an inclined plane; the angle formed by the handle and the inclined plane gradually increasing towards the end of the stroke, which increases the force.

CLAIM:—"Having thus fully described my improvement, what I claim as my invention, and desire to secure by letters patent, is the combination of the inclined plane with the washer or piston, constructed and arranged in the manner and for the purpose set forth."

To NEHEMIAH P. STANTON, *of Syracuse, New York, for an improved process of clarifying salt water preparatory to making salt.*

CLAIM:—What I claim as my invention, is the art or process of separating the impurities contained in salt water or brine, in its crude state, by adding a sufficient quantity of common salt to the salt water taken from the salt springs, wells, or other sources, in its crude state; and when properly mixed and dissolved, to bring the brine in the vats or cisterns to immediate saturation, for the express purpose of precipitating the impurities and depositing them in the bottom of the vats or cisterns, without the aid of evaporation or of solar or artificial heat. I do not claim adding salt to salt water, for the purpose of concentrating, as is frequently done; but I do claim the process, above described, of separating the impurities from salt water by the addition of salt thereto, allowing the impurities sufficient time to settle, and the drawing off for evaporation."

To ADRIAN JANES, *of New York city, N. Y., for an improvement in furnaces for heating buildings, &c.*

CLAIM:—"What I claim as my invention, and desire to secure by letters patent, is the obtaining of additional heating surface, and causing a lengthened circulation of the flame, smoke, and heat, within an enclosure of metal or walls of a hot-air furnace, without any downward draught, by the means of a system of tubes, combined, arranged, and situated as above described."

The furnace or fire-chamber communicates with the chimney by means of a series of tubes, bent in the form of a horse-shoe, placed one above the other, and with sufficient space between each for the circulation of air—the whole being surrounded by masonry, to form a chamber for heating air.

To SOLOMON GUESS, *of Boston, Massachusetts, for a composition of matter for removing acids from cloth, &c.*

CLAIM :—"I claim the afore-specified combination of ingredients, whether in the proportions set forth, or in any other, which may, under any circumstances, be found better applicable for the purpose intended."

This compound consists of four pounds of *fucus vesiculosus* (sea or bladder wrack) boiled in three pints of water until reduced to one, mixed with one quart ox gall, one pound of carbonate of ammonia, three quarters of a pound of alum, and twenty-four pounds of common white soap: the whole is properly melted and mixed together.

To T. C. BENTEEN, *and* H. W. ZIMMERMAN, *of Petersburg, Virginia, for an improvement in the washing-machine.*

CLAIM :—"What we claim is the manner in which we construct the wash-board so as to effect a partial vacuum within its lower portion by centrifugal action, in the manner and for the purpose above described."

The wash-frame moves up and down in a box by a lever, and on each side there is hinged to the box a wing, which, as the wash-frame is lifted, is moved out by projections on the wash-frame; this produces a partial vacuum, by which the parts are forced back, and by this means, the clothes placed between the wash-frame and wings are washed.

To ISRAEL LAMBORN, *of Marshallton, Chester county, Pennsylvania, for an improvement in the beehive.*

THE tubes that form the entrance to the reception chamber are surrounded by two flanches, in the form of inverted cones, containing water, and the tube that forms the entrance from this reception chamber to the hive is surrounded by one such flanch also containing water, and within this tube there is a coiled wire which extends down a short distance into a cup of water, into which the moth will fall in attempting to get to the wire coil.

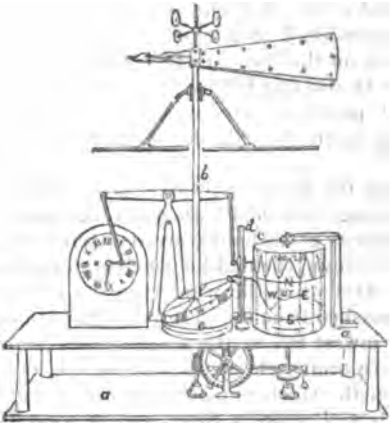
Claim :—"What I claim as my invention, and which I desire to secure by letters patent, is the mode of preventing the moth from entering the hive, and entrapping her by means of the upright metallic tubes and inverted truncated cones forming the entrance to the reception room of the hive, and the upright tube orming a passage between the chamber and lower box, all of faid tubes being surrounded by inverted truncated cones, and containing water, and into which the moth is caused to fall, as described.

I also claim combining with the vertical tube a spiral rest upon which the bees cluster, in the manner and for the purpose set forth."

Scientific Notices.

AN IMPROVED CONSTRUCTION OF ANEMOMETER.

BY MR. JAMES GODDARD.



The increasing attention which men of science are giving to the study of atmospheric influences must be generally known, from the late proceedings of the British Association. An improvement, therefore, in the anemometer, which furnishes the data for such philosophical researches, must, at this time, be peculiarly valuable. We have therefore availed ourselves of the author's communication, more especially as it refers to a subject which the Engineers' Society appears, from the list of premiums for 1847, to be desirous of rewarding.

The advantages obtained by this construction of instrument are stated by the inventor to be as follows:—

1st. The scale of time is five times as large as Mr. Osler's, within equal-sized sheets.

2nd. The register of direction is more accurate, an equal quantity of paper being used, and it can never fail to register.

3rd. The data are more comprehensive.

Description of the improved Anemometer.

It consists of a double vane (shaped like a truncated cone), the small ends being secured to a vertical brass tube *b*, (see the cut) which, passing through the roof of the building where it is mounted, rests, at its lower end, in a hollow socket fixed on a table *a*, that supports the instrument. To the lower end of this shaft is attached a cylinder, which rests upon the table, but follows every movement of the shaft. Its upper face is cut obliquely, and around its periphery the points of the compass are marked. In the centre of the shaft *b*, is a rod, which, at its upper end, carries a fan-wheel, and at its lower end is provided with a worm or endless screw. This worm takes into a worm-wheel mounted in bearings on the underneath part of the table *a*; and on the worm-wheel shaft is another worm for driving, through the agency of a wheel and screw-thread on a horizontal shaft, the axle of the drum *c*. Between the drum *c*, and the oblique-faced cylinder, a vertical guide is fixed firmly on the table, for the purpose of carrying three pencils, one under the other; the two upper of which rise and fall, as will be presently explained. To the top pencil an arm, pendant from one end of a vibrating lever, is attached. This lever is supported by a bracket from the table, and at its other end it is connected by a pendant-arm with the minute-hand of a clock. As the socket of the second pencil rides on the face of the cylinder attached to the shaft *b*, it is made to rise and fall by the rotation of that cylinder; and the lowest pencil is acted upon only when the excentric portion of a ring *e*, on the cylinder, comes round, and forces it forward.

The action of the wind on the fan-wheel causes the apparatus to rotate; and the drum *c*, being furnished with paper, the miles of wind, its direction, and velocity at all hours, are registered thereon. When the north-wind blows, the middle pencil is at its greatest height, and at the lowest when the wind is in the southern quarter: the east is distinguished from the west by the third pencil, which is placed below the lowest fall of the second, and is caused to mark only on the eastern semicircle by the excentric *e*, before mentioned. The first pencil, which is placed above the highest limit of the second pencil, is alternately raised and depressed by the minute-hand, and thereby shews 30m. or 60m.: this is called the "time-pencil." It will now be evident, that by drawing vertical lines up the sheet of paper, so that they shall intersect the highest and lowest points marked by the time-pencil, the movements of the wind, at any given time, may be clearly traced.

Institution of Civil Engineers.

A KNOWLEDGE of the transactions of this Society has, for the last year, been confined exclusively to its members, but, from the following list of premiums awarded for 1846, and offered for the present year, it would seem that the zeal which has hitherto distinguished its career has not yet slackened, although the publication of the Society's proceedings are so much in arrear, that the President's opening address of the last session is only just printed. This delay, which must perhaps be attributed to the members whose approval is required to their own communications before publication, should certainly be corrected; for, however interesting the papers may be to the members, when read and discussed, it is possible that many of them, by the time they are laid before the public, may be worthless, or at least their interest will be diminished.

PREMIUMS, 1846.

The Council of the Institution of Civil Engineers have awarded the following Premiums:—

1. A Telford Medal in Silver, and a Council Premium of Books, suitably bound and inscribed, to William Henry Barlow, M. Inst. C.E., for his paper "On the existence (practically) of the line of Equal Horizontal Thrust in Arches."
2. A Telford Medal in Silver, and a Council Premium of Books, suitably bound and inscribed, to George Snell, Assoc. Inst. C.E., for his paper "On the Stability of Arches."
3. A Telford Medal in Silver, and a Council Premium of Books, suitably bound and inscribed, to Wyndham Harding, Assoc. Inst. C.E., for his paper "On the Resistance to Railway Trains at different velocities."
4. A Telford Medal in Silver, to Edward Leader Williams, M. Inst. C. E., for his "Description of the Improvements of the river Severn."
5. A Telford Medal in Silver, to William Parkes, Assoc. Inst. C. E., for his paper "On the Estuary of the river Severn."
6. A Telford Medal in Silver, to William West, Assoc. Inst. C. E., for his paper "On Water for Locomotive Engines."
7. A Telford Medal in Silver, to Dr. Louis Antoine Ritterbandt, for his "Description of a method of preventing the Incrustation of Steam Boilers," introduced into the discussion upon Mr. West's paper "On Water for Locomotive Engines."
8. A Telford Premium of Books, suitably bound and inscribed, to George Turnbull, M. Inst. C. E., for his "Description of the Harbour and Coal-Drops at Middlesborough-on-Tees."
9. A Telford Premium of Books, suitably bound and inscribed, to John Mortimer Heppel, Grad. Inst. C. E., for his paper "On the relation between the Velocity and the Resistance encountered by bodies moving through Fluids."
10. A Telford Premium of Books, suitably bound and inscribed, to Andrew John Robertson, Assoc. Inst. C. E., for his "Description of the Machinery of the Blackwall Railway."

SUBJECTS FOR PREMIUMS.

Session 1847.

The Council invite communications on the following, as well as other subjects, for Premiums :—

1. The best modes of combining materials, by arranging or cementing them together, so as to insure uniformity of action from change of temperature.
2. On the construction of Retaining and Wharf Walls, with examples of failure and the causes.
3. The construction of Piers and Moles, whether solid or on arches, in a tideway.
4. On the improvement and maintenance of Harbours, both natural and artificial.
5. The arrangement of Docks to accommodate a large export and import trade, connected with inland navigation and railway transit, and with extensive warehouses; shewing the methods employed for preventing the accumulation of silt or sand, at the entrance or within the Docks.
6. The modes of Irrigation in use in Northern Italy; of Drainage adopted in the Lowlands of the United Kingdom, or works of a similar nature in Holland or in other countries.
7. On the Movement of Shingle on exposed beaches, and the deposition of silt in harbours or at the mouths of rivers.
8. An account of the waste or increase of the Land on any part of the coast of Great Britain, the nature of the Soil, the direction of the Tides, Currents, Rivers, Estuaries, &c., with the means adopted for retarding or preventing the waste of the land.
9. The conveyance of Fluids in Pipes, under pressure, and the circumstances which usually effect the velocity of their currents; with accounts of Water Works and Gas Works.
10. The most advantageous method of employing the power of a Stream of Water, where the height of the fall is greater than can be applied to Water Wheels of the usual construction.
11. The Drainage of Mines, exemplified by a statement of the actual condition of some of the Coalfields or Mining Districts of Great Britain.
12. The Ventilation of Coal Pits or Mines in Great Britain or in Foreign Countries.
13. On the proposed substitutes for Gunpowder for blasting Mines.
14. The construction of Anemometers, with self-registering Index.
15. The smelting and manufacture of Metals in Great Britain or in Foreign Countries.

16. The construction of girder Bridges, whether of Iron or Timber.
17. The construction of Wrought Iron Roofs, for covering considerable areas.
18. The comparative advantages of Iron and Wood, or of both materials combined, as employed in the construction of Steam Vessels; with drawings and descriptions.
19. The best mode of constructing Merchant Vessels under the new registry of tonnage.
20. The best forms for River and Sea-going Steam Vessels; with practical examples, giving the sizes of Steam Vessels of all classes, in comparison with their Engine Power, the principal dimensions of the Engines and Vessels, draught of water, tonnage, speed, consumption of fuel, and the various modes of propulsion.
21. The best methods in use for giving Signals on board Steam Vessels, for preventing collisions at night and during fogs.
22. The results of the use of Tubular Boilers, and of Steam at an increased pressure, for Marine Engines.
23. The phenomena of attraction in Steam Vessels when alongside each other, and of the effect upon their steering and their speed when passing over shoals.
24. On the best application of the principle of Expansion, to the improvement of stationary, locomotive, or marine Steam Engines, with examples of the effect of such application, from actual experiment, and a description of the Engines experimented upon.
25. On the term "Horse Power," as applied to Steam Engines.
26. The Economy of Railways as a means of transit, comprising the classification of the traffic, in relation to the most appropiate speeds for the conveyance of Passengers and Merchandize.
27. The internal arrangements of the Termini, and intermediate Stations of Railways, whether for Passengers or Merchandize: and whether independent of or connected with Inland Navigation.
28. Experiments on the Resistance to Railway Trains at different velocities.
29. The construction of Locomotive Engines; especially those modifications which enable additional power to be gained without materially increasing the weight, or unduly elevating the centre of gravity.
30. The various modes adopted for moving Earth in Railway Tunnels, Cuttings, or Embankments, with the cost thereof, giving, from practical examples, the proper slopes for Cuttings and Embankments in various soils.

31. The construction of Railway Wheels and Axles, and the Bearings; treating particularly their ascertained duration and their relative friction.
32. The Electric Telegraph; the several modifications in its construction, and the various uses to which it has been applied.
33. Notice of the principal Self-acting Tools employed in the manufacture of Engines and Machines, and the effect of their introduction.
34. On the most effective and best adapted Machines for bruising or crushing the Sugar Cane, and for separating the juice from the vegetable fibre.
35. The various modes of boring Artesian Wells, and the geological formations which have been found most productive of water.
36. Memoirs and accounts of the Works and Inventions of any of the following Engineers:—Sir Hugh Middleton, Arthur Woolf, Jonathan Hornblower, Richard Trevithick, William Murdoch, (of Soho,) and Alexander Nimmo.

ON THE MEANS OF ENSURING SAFETY ON RAILWAYS,—BEING A REPORT MADE TO THE MINISTER OF PUBLIC WORKS, BY M. DE BOUREUILLE, HEAD OF THE RAILWAY DEPARTMENT.

[Translated for the London Journal, from the "Bulletin de la Société d'Industrie."]

(*Continued from page 360.*)

It was observed by the Commission, that in locomotive engines there were many parts subjected to considerable strain and violence, the rupture of which would be of minor importance, and that they might therefore, without much inconvenience, be allowed to remain in use until nearly worn out: of this kind are the rods which connect the locomotive to the tender, and also the bolts which serve to fasten them. By manufacturing several similar pieces with care, putting some of them in use, and keeping the others for the purpose of comparison, the Commission is of opinion that interesting results might soon be arrived at.

To conclude, as regards axles,—it only remained for the Commission to enquire into the precautions to be taken in the case of breakage of axles, in order to prevent any accidents arising therefrom. Plans have been proposed for this purpose by a great number of inventors, which it may be as well to make mention of here.

These plans may be divided into two categories; the first of which consists in the employment of wheels running on the rails in front of the engine, and serving as guides. The second consists in the employment of guides on the rails, the rods of which, being attached to the framing of the engine, are intended to keep the train in its place on the rails. Neither of these plans appeared to the Commission susceptible of useful employment. The guide-wheels would have the inconvenience of preventing the engineer from perceiving the breaking of the axle in time to stop the train.

With regard to the guides, if they were made, as proposed, in the form of drags, they would cause shocks and serious accidents; they also would not offer any resistance to the oscillations of the engine; if made light, they would readily be broken when subjected to a violent shock; and if heavy, they would evidently facilitate the running of the train off the rails.

If, however, mechanical means must be employed for preventing the accidents likely to arise from the breakage of axles, what is the plan to be adopted? On this head, having ascertained, as nearly as possible, what would be the position of a train at the time of breaking an axle of the engine, the Commission has arrived at the conclusion that it is chiefly by prompt and active precautions that the evil consequences of an accident of this kind are to be prevented. It very seldom happens, when an axle breaks, that the engineer does not perceive, by the oscillation of the engine, that it has sustained some serious injury; he must then immediately shut off the steam from the cylinders, and do his best to stop the train without any shock. The safety of the train mainly depends upon the engineer; it will therefore be understood how necessary it is to be particular in choosing suitable persons to fill this post.

As regards the working of railways, another not less important question occupied the attention of the Commission. On the occasion of the Versailles accident the general opinion was, that nothing fatal would have happened if the locomotive "Matthew Murray" had been mounted on six wheels instead of four. This appeared also to be the opinion of Government, as one of the first precautionary measures was to prohibit the companies in the environs of Paris from making use of locomotive engines with four wheels. Before, however, this measure was made general (the immediate application of which would prove ruinous to many other companies besides those in the environs of Paris), the Commission thought proper to enquire into it as regards safety, and for this purpose took an account of the number of accidents which had happened upon railways worked with locomotives, either of six or four wheels, and the conclusion they came to was that, as regards public safety, the six-wheeled engine possessed some advantage over the four-wheeled engine, especially when the two driving-wheels are provided with flanges; this advantage is not, however, so great at present as entirely to do away with the four-wheeled engines. The attention of engineers must be especially directed to the improvement of the six-wheeled engines, and there is no doubt that when these engines have undergone the improvements which may be suggested, they will be generally preferred.

The parties in favor of the four-wheeled engines brought forward, in support of their opinion, the fact that, in six-wheeled engines, the centre of gravity of the whole was always before the cranked axle, and that, therefore, in case of the front axle breaking, these engines would fall as easily as the four-wheeled engines. On the other hand, by placing the framing which supports the four-wheeled engines inside, the fall of the wheels is prevented when an axle breaks, and there is no further fear of accident: but the Commission observes, that if in most of the present six-wheeled engines the centre of gravity is in front of the cranked axle, there is no practical impossibility in bringing it upon the axle itself. The front axles are, besides, not the only ones the rupture of which is to be feared; the cranked axles frequently break, and such accidents, which are not much to be feared in a six-wheeled engine, may have serious consequences in a four-wheeled engine.

With regard to the advantage attributed to placing the framing inside, it is, perhaps, sufficient to observe, that this arrangement does not apply particularly to four-wheeled engines, and that nothing conclusive can be arrived at as regards the safety of the engines fitted up in this manner. It does not appear certain that this will prevent the running off from the rails on the breaking of an axle.

Before quitting this subject, the Commission has thought fit to take into consideration a question touching the safety of property situated along the line of rail, as regards the danger of fire from the engine. Accidents of this nature have occurred, at various times, upon different lines; two are reported to have very recently happened, within as many days, upon the line from Alais to Beaucaire. It would, therefore, be advisable to ascertain what measures could be adopted to prevent such accidents.

Fires can only arise from two causes: — 1st. The sparks escaping from the chimney of the locomotive: 2nd. Portions of incandescent or ignited fuel falling from the furnace, which falling pieces, even should there be no wind, are driven along by the current of air produced by the rapid movement of the train.

As regards the sparks which issue from the chimney, the Commission observes, that since railways were first worked, the chimneys of locomotives have always been furnished with a woven wire guard, which stops the sparks, and at the same time returns into the smoke-box a portion of the pulverulent substances which, when allowed to escape, cause great inconvenience to travellers. This guard has since been somewhat improved; for instance, it has been formed of a closer fabric; also the chimney has been formed trumpet-mouthed, with iron wires stretched across it, whereby a stronger guard than the ordinary one is formed.

The employment of the guard not having, however, always produced satisfactory results, other methods have been resorted to, which it will perhaps be advisable here briefly to describe: —

A strong metallic basket was placed at the lower part of the chimney, in the form of a truncated cone with its small end downwards. By this arrangement the portions of cinder and ignited fuel are presented obliquely to the meshes of the fabric, and therefore the smoke will have great difficulty in drawing them up. A horizontal cover was placed in a part of the chimney to arrest the portions of cinder and fuel, and throw them back to the bottom of the chimney, and the smoke escaped by lateral openings. In some cases, these two plans have been combined in one chimney, one above the other. Lastly.—A plate of iron pierced with round holes, about one-third of an inch in diameter, was placed in the smoke-box, in a horizontal position; whereby all the solid portions of fuel, which were not presented directly to the orifices, were immediately thrown back to the bottom of the smoke-box.

To these may be added another method tried in Germany, which appeared to produce satisfactory results. It consists in placing a fan, or wheel furnished with wings, on the top of the chimney, at an inclination of 45°, which, being put in motion by the heated air issuing from the chimney, drives the sparks to the sides of the chimney, where they are extinguished and fall back.

The Commission having ascertained the advantages of these several plans, was of opinion that there was no occasion to recommend any one of them in particular, but that it would be advisable to submit each to regular experiment; and until it should be shown by experience which was the best, the railway companies should be obliged to use one of them.

With regard to the ignited fuel falling from the furnaces of locomotives, the only means known of preventing the accidents which may result therefrom, is by employing an ash-pan to catch the cinders, and thereby prevent them from falling to the ground. There are, however, several disadvantages attending their use, such as—preventing the draft; being too near the ground; causing the bars of the furnace to wear away more quickly, and rendering the cleaning of the furnace more difficult; and, lastly, —preventing the engineer from immediately putting out his fire, should it be necessary to do so.

An arrangement might, however, be contrived to do away with these disadvantages, either wholly or partially, in which case the ash-pans might be employed with great advantage; but in the present state of things, the Commission is of opinion that there is no occasion to recommend their employment, and can only propose to await the result of longer experience.

A very important question was next discussed by the Commission, viz., whether more than one locomotive ought to be allowed to be attached to a train. The conclusion arrived at was, that there was always disadvantage, and sometimes danger, attending the use of more than one engine. It is, in fact, impossible that the engineers of the different engines should always act in concert; and moreover, if the foremost engine should meet with any accident, rendering it necessary to stop, the hinder one, continuing to progress, would most likely throw it off the rail, if the speed were considerable.

The Commission is therefore of opinion that more than one engine ought not to be used to one train, except, in certain cases, on railways in the environs of Paris, or other large cities, where there are an immense number of passengers.

Under these circumstances, when it is absolutely necessary to use two engines, how are they to be attached? If one of them is a six-wheeled engine, which of them is to be placed in front; and if both are six or four-wheeled, should the heaviest or the lightest be placed in front?

In order fully to answer these questions, the Commission thinks fit to remark that the principal danger consists in the probability, in certain cases, of the front engine being pushed forward by the hinder one; in which case it is liable to go off the rails, and might thereby cause very serious accidents. Under these circumstances, as the six-wheeled engines are more firm than the four-wheel, and are for that reason less likely to get off the rails, when two engines, one of six and the other of four wheels, are to be employed in one train, the six-wheeled one should be placed in front. For the same reason when two engines of different weights are employed, it is desirable to place the heaviest foremost.

The Commission adds, that it will be better to have both engines exactly alike, and that the principal point to be observed when two engines are employed is, never to allow the hindmost one to be driven at a greater speed than the foremost, and also to take care that the driver of the front engine has the driver of the other engine under his control.

The next question discussed by the Committee was, whether, as regarded safety, the position of the engine in front or behind the train was material. With respect to this, it appeared evident that the engine-driver, if placed behind the train, could not easily see what was going on in front, and that, therefore, there would be great danger of his not perceiving any obstacle. The Commission was therefore decidedly of opinion that the locomotive ought never to be attached to the hinder part of the train.

Having thus disposed of the questions relative to the engines, the Commission enquired into the different plans employed for linking the carriages together. There appeared to be three:—

The first consists of chains of a certain length, leaving a certain space between the carriages, independently of that allowed for the play of the springs. The second consists in the employment of moveable bars, which also allow of the play of the springs, but unite the carriages more rigidly than the first plan.

The third, and last plan, consists in uniting the carriages rigidly together, by screws and keys.

On comparing these plans, the Commission remarked, that as regarded the first, independently of the disadvantage it possessed of causing unpleasant shocks in starting, serious accidents might be occasioned, in the case of a violent shock, by permitting the carriages to run over each other. It was, therefore, considered that the best mode of uniting the carriages would be by rigid fastenings acting upon springs. By this means, in case of a collision, the train would offer the resistance of a solid mass, and there would be no danger of the carriages running over one another.

The only disadvantage of this plan would be, requiring more power from the locomotive; but this is a minor consideration, when the safety of the passengers is concerned. The Commission was therefore of opinion, that the carriages should be united in such a manner as to allow of the buffers being always in contact.

Another no less important question was, whether vehicles with cast-iron wheels ought to be allowed between the tender and the passenger carriages. This was decided in the negative, as it appeared that cast-iron wheels, running with great speed, would soon wear, and were liable to break; in which case, the train would be almost sure to be thrown off the rails.

The Commission having thus decided upon the best means of forming the trains, as regarded the safety of the passengers, the subject next to be considered was the best means of regulating the speed of trains, and freeing them as much as possible from danger of accident, to which they might be exposed.

The most usual causes of accident may be resolved into one, viz., a sudden shock, produced either by the locomotive coming into contact with some obstacle; by the breaking of an axle; or by running off the rails.

As regards the breakage of axles, accidents likely to occur therefrom may be most readily prevented by the promptitude and intelligence of the engine-driver.

With regard to shocks and sudden stoppages, what tends most to increase the danger is the speed at which the train is travelling; in order therefore either wholly or partially to obviate them, it is desirable to find out the best means of slackening the speed at pleasure. For this purpose brakes are used, which act by pressing on the periphery of the wheels of one or more carriages of the train, and by that means diminish the speed.

The brakes most commonly used upon railways may be divided into three classes.—1st. Brakes acting on one wheel only of each axle, and pressing on one side of the wheel.—2nd. Brakes acting on one wheel of each axle, but pressing against both sides of the wheel.—3rd. Brakes acting on both wheels, and on one side of each wheel.

Neither the first nor the second ought to be used, as they have a tendency to dismount the wheel opposite to that on which they act; and the first, especially, has a tendency to destroy the parallelism of the axles, which might occasion serious accidents.

The third class of brakes possesses neither of these inconveniences. It is true that, by acting on one side of the wheel only, the whole of the pressure will be exerted upon the pivot of the axle; and although this pressure is equal to the weight supported by the wheel (and consequently the pivot of the axle does not sustain much more strain than under ordinary circumstances), the best plan would no doubt be that by which a pair of wheels would be acted upon on both sides simultaneously: the efforts of inventors should therefore be directed to this object.

With regard to the brakes now in use upon railways, the Commission was not sufficiently informed upon the subject to be able to recommend any one of the proposed plans, and it appears that careful experiments would be necessary to decide the question.

The following are the facts to be considered in these experiments:—

1st. What is the time necessary for enabling the person having the management of the brake to produce sufficient pressure on the wheels to stop them, including the time necessary for signaling?

2nd. What is the time necessary to elapse, and what distance will have been travelled, before a carriage, travelling at various speeds and provided with efficient brakes, can be stopped?

This experiment ought to be tried many times, under various atmospheric tendencies, in order to test the effects of dryness, dampness, or hoar-frost, or the effect of throwing sand on the rails, as was proposed and practised on the railway from Saint Etienne to Lyons; the experiments should be made upon levels as well as inclines.

3rd. What is the time necessary to elapse, and the distance to be run over, in order to stop a train composed of a locomotive and tender, and six or eight ordinary carriages, on different inclines and under various atmospheric influences, the carriages being provided with brakes, and driven at various speeds, making use,—1st. Of the tender brake, the steam being shut off.—2nd. Of one, two, or more of the carriage brakes, the steam being shut off.—3rd. Of all the brakes, and reversing the engine; in fact, employing all the means known for stopping.—The Commission, in considering the question as to the propriety of skidding all the carriages, is of opinion that it would perhaps be advisable, when proceeding at a speed of from twenty-five to thirty miles an hour, to adopt this method; but generally, in a train composed of a locomotive, tender, and seven or eight carriages, only one of the carriages is provided with a brake, and the Commission wished to ascertain which carriage it should be applied to.

It was remarked that, independently of the momentum acquired by the carriages respectively, each of them is, at the time of stopping, pushed forward by the one behind it, especially when connected loosely by chains; it therefore appeared advisable to provide the last carriage with a brake, which should act at the moment of stoppage, and, by thus offering a resistance, the force of which may be mathematically calculated, tighten the connecting chains or rods of the front carriages.

Should any apparatus be used to deaden shocks? And if so, what position ought it to occupy?

On this subject, the Commission is of opinion, that if it were possible to throw the whole or the greater part of the force of the shock upon any inert body, the safety of the carriages would be much increased; and as to the place it ought to occupy in the train, the Commission considers it best to place the brake between the tender and the passenger carriages.

Several kinds of apparatus adapted for this purpose, were presented. Some of them were composed of metallic springs, which would be gradually compressed by the shock, and by that means slacken the speed of the train; and others were composed of air-springs acting upon the same principle.

With regard to the former, they would be the more efficacious, in proportion to the time they allowed the train to run while compressing the springs; but, at the same time, the length of the springs must not be such as to cause danger of running off the rails when traversing curves. On the other hand, it will be understood, that it is advisable to construct them so as to offer the greatest possible degree of resistance; their weight must not, however, be greater than that of an ordinary loaded carriage. In order to produce the desired effect, the apparatus should be so constructed as to allow the train to bear the greatest possible compression without injury; occasion no danger in traversing curves; and offer the greatest possible resistance with the least weight.

With regard to the air apparatus, it would not act efficiently unless made of very large dimensions, so as to present a large body of air to be compressed; this kind of buffer is therefore inadmissible, from its bulk. In fact, as the density is in an inverse ratio to the volume of air, the apparatus would not act until the piston, meeting with resistance from the air, would be nearly at the end of its course, at which point it would not offer any efficient resistance to a shock of any considerable violence.

It appeared to the Commission, that an apparatus offering great resistance would not act so efficiently as one which would be broken by the shock of a collision.

It was thought that it would be advisable to propose a prize to the inventor of any apparatus, which, after being in use for some time, was found to act efficiently.

There are some preliminary arrangements, as regards safety, to be considered. One precaution which has been adopted consists in interposing between the tender and the passenger-carriages as many empty carriages as there are locomotives: this precaution may, in most cases, preserve the passengers from injury.

IV. *Of Rules to be enforced by Law in Working Railways.*

The first point to be considered, as regards safety in railway transit, is the working with perfect regularity, and subject to fixed rules, which must never be infringed; it is clearly the duty of Government to legislate on this subject.

By the present laws, railway companies are empowered to frame bye-laws for working, but they are obliged to submit them for the approval of the higher authorities. This is a salutary regulation, and the companies ought to be bound to inform the Government, in good time, of the hours fixed for the departure of the trains, as well from the termini as the intermediate stations.

Express trains must be used as rarely as possible, and only when they are absolutely necessary: their approach must be signalled along the line.

The Commission has not given much attention to cases where accidents might happen from two trains meeting on the same line. On railways, by which a great number of passengers travel, there are always at least two lines of rail, and the only likelihood there is of one train running into another, is when they are both travelling the same way; and even this might be avoided if the officials were to adhere to the times fixed by the authorities for departure from the termini, and those fixed by themselves for the intermediate stations.

Independently of the shocks which may happen when the trains are in motion, passengers have sometimes been seriously injured from shocks occasioned on stopping at the termini, by coming into contact either with the walls or the carriages. This occurs either from the ignorance or negligence of the engineers, and sometimes from a derangement of the brake not allowing the train to be stopped with sufficient promptitude.

In order to obviate this, it would be advisable to direct the engine-drivers to stop the train completely before reaching the place where the passengers are to alight. When a train is in progress, it is indispensably necessary for the engine-driver to be constantly warned of all that passes on the line; and for this purpose there must always be, between the engine-driver and station-guards, certain signals, which may be readily understood by the latter; and by means of which the station-keepers may always communicate with each other. Signals between the engine-driver and guard of railway trains either do not, for the most part, exist, or are very imperfect. It will, nevertheless, be readily conceived, that many casualties may arise during the progress of a train, of which it is necessary for the engine-driver to have notice,—as in case of the breaking of an axle, the carriages running off the rails, &c. The Commission thinks that Government ought to direct, that in each passenger-train there should be a guard, furnished with the means of communicating the necessary intelligence to the engine-driver.

Another subject of great importance in railway transit is the question,—at what speed they should travel? and on this head, the Commission deliberated, first, whether it would be advisable to fix a maximum speed; but it was found, that a speed which would be without danger on very slight inclines and curves of large radius, would be extremely dangerous on steep inclines and curves of small radius, and which were to be traversed by heavy trains; it is, therefore, proposed to fix a maximum speed for each road, regard being had to the inclines and curves on each line, and also to the trains to run upon it.

It would also be very useful for each engine to be furnished with an apparatus for indicating (permanently and independently of the will of the engineer) the maximum speed of the train at any period of its journey.

V. *Of the capability of the persons employed upon Railways.*

The arrangements recommended by the Commission would be totally inefficacious, if the persons employed to carry them out were not competent. It may be said, without exaggeration, that the lives of some hundreds of persons are sometimes in the hands of the engine-driver. If he is not perfectly acquainted with the engine he has to drive, if he is not possessed of prudence and self-possession, or is not sober and steady, who knows what may be the consequences of employing him!

The Commission having thought it necessary to point out the qualifications necessary for engineers, is of opinion, that Government ought to interfere in this also, and require the companies to send such persons to be approved of before being employed.

Proposed Regulations relative to Engineers.

1st. No person is to be allowed to drive an engine, unless provided with a certificate of capability, granted according to the following articles:—

2nd. A commission shall be appointed in towns appointed for that purpose, to examine applicants for the situation of engineer.

3rd. The candidate must produce, 1st, a declaration, proving that he has served, during six months at least, as a working engineer or adjuster, in a manufactory of locomotives, or as stoker, during a year, upon a railway, and that he is competent to take an engine to pieces, put it together, and repair it; 2nd, a declaration made by the chief engineer of a railway, stating that, under the guidance of an engineer, the bearer of the certificate has driven railway trains, in a satisfactory manner, during two months at least.

4th. The candidate must be acquainted with the mechanical properties of steam; be able to make up the fire, light, and put it out; explain the name and use of all the parts of the engines; he must also be aware of the injuries which a locomotive engine might sustain, and the means of remedying the same.

5th. After examination, a certificate of capability will be delivered to the candidate, by means of which he can be admitted as engine-driver on any railway in France. If, however, he is desirous of changing from one line to another, he must submit his certificate to the inspection of the Prefect and the engineer having the superintendence of the line upon which he is desirous of being employed.

6th. Should an engineer be guilty of negligence, or in any other manner endanger the public safety, his certificate may be annulled by the Minister of Public Works.

Note on Experiments made upon the new line of rail at Saint Germain, with a Locomotive constructed by M. Flachat,—by M. Clapeyron.

The town of Saint Germain is situate on an elevation of about sixty yards above the plain upon which the line of rail terminates at the Pecq Bridge. The atmospheric railway overcomes this difference of level by means of a series of gradients, forming altogether a parabolic curve, sloping towards the earth, and terminating in a gradient of 1083 yards in length, and having an inclination of 35 yards.

M. Flachat, who was charged with the superintendence of the works, acknowledged the necessity of constructing a powerful engine, capable of propelling upon steep inclines the materials necessary for the construction of the road, and the apparatus for the atmospheric plan. The engine is now employed for drawing earth from cuttings in the forest of Saint Germain; the waggons running up empty, and returning full.

The experiment made on the 17th of June last, was for the purpose of ascertaining the maximum weight the engine was capable of drawing on the above incline. The train consisted of four waggons loaded with earth, and weighing, when empty, between three and four tons.

One was found, when loaded with earth, to weigh nearly 12 tons. The load, on descending, was therefore—

The Engine, weighing about	20 tons.
— Tender	9 ..
Four loaded Waggons	44 ..
A Brake Carriage	3 ..
	76 tons.

The train started at a moderate speed, with the regulator entirely closed. The train having once stopped, it was found to be impossible to ascend again. One, two, and three waggons were then successively emptied, and it was not possible to ascend the incline until this was done. The train therefore consisted of—

The Engine	20 tons	29 tons dead weight.
— Tender	9 ..	
Three empty Waggons	9 ..	23 tons useful weight.
A loaded Waggon	11 ..	
A Brake Carriage	3 ..	

This experiment was made twice, and gave the same results both times.

The engine was working at a pressure of five atmospheres; the power it exerted, supposing the action of the steam to be the same throughout, was therefore about 3 tons 4½ cwt. The resistance to be overcome was as follows:—

	Tons.	Cwt.	lbs.
Friction of various kinds, reckoned at $\frac{1}{200}$ of the weight (76 tons)	0	7	56
Action of gravity	1	16	0
	2	3	56

There remains a difference of 1 ton, 1¼ cwt., owing to the diminution of pressure, and additional friction of all kinds, and other casualties.

It will, of course, be understood, that on less steep inclines this tractive power will be much increased.—[*Acad. des Sciences,* 22nd June, 1846.]

Scientific Adjudication.

COURT OF COMMON PLEAS.

December 21st and 22nd, 1846.

Before Lord Chief Justice Wild, and a Special Jury.

YOUNG *v.* QUINCEY.

Mr. Serjeant Byles, Mr. Cowling, and Mr. Dowdeswell, for the plaintiff; Mr. Montague Chambers, Mr. Cleasby, and Mr. Webster, for the defendant.

This was an action to ascertain the fact of an alleged infringement of a patent granted 28th May, 1842, to William Young, of Queen-street, lamp-maker, for his invention of "improvements in lamps and candlesticks." The case came before the Court of Common Pleas by reference from Chancery.

The invention of the plaintiff consisted of eight parts or subjects; but several of these, including that portion of the title which relates to candlesticks, had been disclaimed, and the particular features retained and said to be infringed related solely to lamps, in which spirits were to be burnt instead of oil. The lamps were denominated by the patentee the "*vesta lamps*."

The defendant also had a patent for a lamp, taken subsequently to the plaintiff's, wherein spirits were to be burnt instead of oil,—his he called the "*standard lamp*;" but the defendant's patent was not before the court for enquiry as to its validity; the question being merely whether certain arrangements and things employed by the defendant, in his standard lamp, constituted piratical imitations of the matters claimed under the plaintiff's patent. The points upon which the present question of similarity was raised, were referred to in the plaintiff's specification, under his first, second, and fifth claims; viz., "Firstly,—the mode of constructing lamps, whereby a series of wicks are used to produce a ring of flame, and in such manner that the air, passing into the interior of the flame, passes between the wicks; Secondly,—the application of the apparatus *m*, (a sliding ring), which, being raised or lowered, governs the height of the series of wicks which shall be offered to the flame; and, Fifthly,—the mode of applying wood or other non-conductor of heat as a means of preventing the conducting down of heat" (from the burner to the spirit-vessel below).

The scientific witnesses for the plaintiff were Mr. Cowper, Mr. Brande, and Mr. Cooper, who all maintained that the lamp of the defendant was precisely the same in principle as that of the plaintiff; for in both a ring or cylindrical flame was produced by the combination or continuity of the cotton, and the air was admitted to the interior of the flame by being allowed to pass through or between openings in the wick; the mode of restraining the combustion of the cotton was also, in both, by a sliding cylindrical guard; and the heat from the burner was prevented passing down into the reservoir or spirit-vessel below by the intervention of a non-conducting or imperfectly conducting material placed between the burner and reservoir. In the course of the examination of these witnesses several specifications of patents, obtained prior to that of the plaintiff's, were produced. In Seaton and Rice's patent lamps it was admitted that the wicks were so combined that they produced a ring of flame like an Argand lamp, and the air was allowed to pass between the wicks to the interior of the flame. The mode of regulating the combustion of the wick, by sliding up and down a cylindrical shield on the outside of the burner, was found in Parker's patent applied to a spirit lamp placed under a coffee pot. After these facts had been proved, the plaintiff's counsel appeared to abandon those parts of the infringement which had reference to the ring of flame—the passage of the air between the wicks—and the regulation of the flame by a sliding shield; and confined their arguments to the identity of a non-conducting material placed between the burner and the reservoir of spirit.

In oil lamps, the heat of the burner being conducted to the oil reservoir, is of no consequence; but in lamps in which spirit is burnt, it is of importance to keep the reservoir cool; for, by becoming heated, the spirit will evaporate, and cause the lamp to emit a large quantity of smoke. The plaintiff, therefore, introduces between the burner and the spirit-vessel a non-conducting material; the defendant, in his spirit lamp, for the same purpose, also introduces between the burner and the reservoir a non-conducting material.

In the course of examination it was elicited from the scientific witnesses that, prior to the plaintiff's patent, there was, in Newton's specification of a vapour lamp,* a non-conducting material, or an imperfect conductor of heat, placed between the burner and the spirit reservoir, to prevent the heat of the burner passing down to the spirits below. This non-conductor consisted of a collar of felt, or some such material, placed between the burner and reservoir; but it was argued, that this did not form a perfect insulation, because the upper and lower parts of the lamp were attached together by small pins or screws, probably of metal, passed through the non-conductor; and that, therefore, such attempted insulation was defective, and different from the plaintiff's mode of applying a non-conductor. The defendant's non-conducting material was a ring of glass or earthenware, so placed as to prevent the heat of the burner passing laterally to the spirit-vessel: the question, therefore, to be resolved was,—had the defendant imitated the plaintiff's "mode of applying wood or other non-conductor of heat." It was admitted by the scientific witnesses, that if the wood were to be removed from the plaintiff's lamp, the air which would then occupy the intervening space between the burner and reservoir, would be an equally good non-conductor of heat.

Mr. Salt, a lamp-maker, of Birmingham, had made for the plaintiff a great number of the patent lamps; that is, lamps upon the principle, but not exactly like those described in the plaintiff's specification. Mr. Taylor, a lamp-maker, was of opinion, that the ends or objects of both the plaintiff and defendant's inventions were the same, but that their means of carrying it out were not exactly alike.

The case of the plaintiff having closed,—Mr. Montague Chambers, on behalf of the defendant, considered that no evidence of infringement had been made out; and that, therefore, before he addressed the Jury, or called any evidence on the part of the defendant, he should submit to the Judge his legal objection to the plaintiff's patent. The plaintiff claimed, under the fifth head (the only one now to be considered to have been infringed), "the mode of applying wood, or other non-conductor of heat, as a means of preventing the conducting down of heat, as described in respect to figs. 12, 13, 14, 15, 16, and 17," of his drawings.—Now, here a particular mode of applying a non-conductor is set out; the use of a non-conductor is not claimed, but the mode of applying a non-conductor. The plaintiff could not claim the use of a non-conductor, for that had been employed before in Newton's patent; therefore he very properly limits his invention to his particular mode. The defendant has not employed the same mode, but a very different one. Newton prevented the conducting of heat from the burner to the spirit-vessel by a collar of felt, one of the best possible non-conductors, which cut off the communication; the plaintiff employed wood, or, it might be, the intervening air, to prevent the heat of the burner being conducted downwards; the defendant employed collars of glass or of earthenware to prevent the heat of the burner passing laterally. The principle of using a non-conductor was not pretended to be claimed by the plaintiff—but only his mode of applying a non-conductor. There were now before the Court three modes of applying the principle, all of them, in his (the counsel's) opinion, essentially different; therefore, if it could be said that the defendant's mode of preventing the conducting of heat was an imitation of the plaintiff's, then the plaintiff's could not be held as new, for it had been anticipated by Newton. For these reasons, he submitted, the defendant could not have infringed the plaintiff's patent.

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* This Patent was sealed 21st December, 1841.

Mr. Cleasby, on the same side, considered that, as at the date of the plaintiff's patent the principle of preventing the conducting of heat from the burner to the spirit-vessel was known and applied, though not perhaps in precisely the same mode as the plaintiff applied it, therefore the principle was open to the public, who might apply it, as the defendant had done, by a different mode to that described by the plaintiff. If this is not so, then no mode could be adopted of insulating the parts of a spirit-lamp.

Mr. Webster submitted that there was no case for the jury. It was for the judge to say what was the claim in the plaintiff's specification: certainly he can only claim his mode; he is limited to his mode, as described. The counsel also adverted to the defendant's employment of a cylindrical wick, and admitting the air below, as in an ordinary Argand burner, which plan was different to the plaintiff's series of wicks, with passages for the air to pass through to the interior. The mode by which the defendant prevented the conducting of heat, was by a ring of glass or porcelain, and, by a film of air; the former intercepted the heat in a lateral direction; the latter prevented its descending to the reservoir of spirit. The defendant's mode was not the plaintiff's mode. They might be distinct patents, both valid; but it was not shown what was meant by the plaintiff's mode. Was the wood to be considered the non-conducting matter claimed? It was said by the plaintiff's witnesses, the lamp would act as well without wood, for the air would be a non-conductor. The question, therefore, must be—Is the plaintiff entitled to air as a non-conductor, the principle of employing a non-conductor being in Newton's specification? In the counsel's opinion, the plaintiff was only entitled to his peculiar mechanical arrangement, and this the defendant had not in any degree imitated.

Mr. Serjeant Byles, for the plaintiff, adduced several cases, which he considered as illustrative of the plaintiff's claim; urging, that the use of different materials did not avoid a trespass on an original invention. He admitted that the plaintiff had no right to the exclusive use of the principle; but to his particular mode of preventing the conducting of heat in spirit-lamps, he had an undoubted right; which mode was the introduction of a non-conductor of heat in that situation between the burner and the reservoir, however fitted or adapted to the purpose. Mr. Cowling and Mr. Dowdeswell followed in the same line of argument, confining the alleged infringement solely to the non-conductor.

The Lord Chief Justice said, there appeared, from the views taken of the plaintiff's fifth claim, to be a doubt whether the wood was introduced into the plaintiff's lamp as a non-conductor, or only as a means of holding the metallic parts of the lamp together; and whether or not the column of air was intended to be the non-conducting matter. He considered that, by the plaintiff's using in the body of his specification the words "wood, or other material applied to the lamp, to act as a non-conductor of heat," that he meant wood or other solid substances, as it was rarely found that the term "material" was applied to air. Whatever might be the meaning of the words, the plaintiff claimed the "mode" of adapting it,—he claimed the mode of adapting a known principle by novel means. His lordship was of opinion, that the claim was for wood, or other affixed non-conductor, not air. The learned judge said, it was his duty to decide whether there was any evidence to go to the jury, either of a substantial or colorable infringement of the plaintiff's patent. It was for him to explain the distinction in point of law; and the question was, whether there was any evidence to submit to the jury, in deciding that point. By the laws applying to patents, the plaintiff is bound to communicate in his specification not only the way, but the best way, of carrying his invention into effect. If, therefore, the air was the effective thing, he has not stated it, nor has he said whether the wood was essential, or employed merely to keep the parts of the lamp together. His lordship could not consider the air to be claimed by the plaintiff; his claim was, the application of a known principle by peculiar means,—the introduction of wood between the burner and the reservoir. Has the defendant done the same thing, or adopted the same mode? It appeared to his lordship, that there was no such similarity between the two. The plaintiff interposes wood or other similar material, not air; surely the material to be affixed is not air. The defendant therefore, if he has done the same by a column of air, has interposed a non-conducting material, by a totally different mode. Does the plaintiff claim every mode of introducing a non-conductor in that situation? That would be too large for him: he has only introduced wood, and not claimed every thing else. Restricting, therefore, the plaintiff's claim to the introduction of wood, his patent has certainly not been infringed by the defendant, as there is no proof that the defendant has employed wood for the like purpose. The learned judge, for these reasons, considered there was nothing to submit to the jury, as no evidence of infringement had been given before them: he should therefore direct the jury to find a verdict for the defendant.

Mr. Serjeant Byles considered there was evidence to be submitted to the jury, and requested his lordship to make a note of his objection, which his lordship did, in order to allow the plaintiff an opportunity of raising the argument at a future day, as to a misdirection of the judge.

His lordship felt satisfied that there must be a verdict entered for the defendant. The jury, after hearing some further observations from the learned judge, stated that they found their verdict in accordance with the directions of his lordship, but that they were unanimously of opinion that the plaintiff's patent had been infringed.

The Lord Chief Justice said, the jury could not come to that conclusion without having heard the argument on the other side. One of the jurymen replied that they had heard the evidence as to the infringement.

His lordship remarked, that the jury must bear in mind that it would have been the duty of the learned counsel for the defendant to point out to them the weight of that evidence, and to show how far it ought to be allowed to influence their minds.—A verdict was then entered for the defendant, by the direction of the learned judge.

LIST OF REGISTRATIONS EFFECTED UNDER THE ACT FOR PROTECTING NEW AND ORIGINAL DESIGNS FOR ARTICLES OF UTILITY.

1846.

Nov. 30. *The Reverend Richard Chute Codrington*, of Haygrove, near Bridgewater, for an elongating carriage axle.

Dec. 2. *Frederick Marriott*, of 335, Strand, for an improved publicity omnibus.

Dec. 2. ***John Britten***, of Liverpool, chemist, for a loose neck for bottles.

2. ***Charles Heard Wild***, of 25, Mortimer-street, Cavendish-square, for rails upon the upper surfaces of railway turn-plates.

3. ***Benjamin Pulleine Ascough***, of Masham, in the county of York, tallow chandler, for revolving bars for turning a candle-dipping apparatus, suspended from the four corners, for the purpose of wiping the candles on both sides.

3. ***William Debonaire Haggard***, of No. 8, Sussex-terrace, Hyde-park, Middlesex, for a double protractor.

4. ***James Deen***, of 317, Oxford-street, army tailor, for a double coat.

4. ***T. E. Clarke***, of Tremlett House, Wellington, Somerset, for a closing stove.

5. ***William Batty Mapplebeck***, of Bull Ring, Birmingham, ironmonger, for an improved bread-knife.

5. ***William Batty Mapplebeck***, of Bull Ring, Birmingham, for an improved screw-driver.

5. ***William Batty Mapplebeck***, of Bull Ring, Birmingham, for an India-rubber holder.

5. ***William Batty Mapplebeck***, of Bull Ring, Birmingham, for an improved nut-crack.

5. ***William Batty Mapplebeck***, of Bull Ring, Birmingham. for a rotatory blotter.

5. ***William Batty Mapplebeck***, of Bull Ring, Birmingham, for a wax taper holder.

5. ***William Healy, of the firm of Burbidge & Healy***, of 130, Fleet-street, London, for an improved Polmaise stove.

7. ***Frederick John Evans***, superintendant of gas works, Brick-lane, Old-street, for an improved gas or air exhauster or blower.

7. ***Johnson & Maples***, of 57, Charles-street, Goswell-road, London, for a portable stove.

7. ***Thomas Pope***, of Devonshire Cottage, Kennington-oval, Surrey, for a measure funnel.

9. ***William Truman Harford Phelps & John Hughes***, of Newport, in the county of Monmouth, engineers, for a wrought-iron tram-wheel.

Dec. 12. *Joseph Bunnett*, of 26, Lombard-street, London, for an improved bench or flooring cramp.

14. *Pierce & Kolle*, of 5, Jermyn-street, St. James's, for exhausting ventilators for drawing off impure and foul air.

16. *Edward Colsell Rose*, of Northfleet, county of Kent, for a domestic telegraph.

18. *B. W. Hickling*, of 35, Noble-street, Cheapside, for an universal fitting shirt front.

24. *James Parker & Charles Page*, of 10, Bacon-street, Bethnal-green, for a cane rib for parasols.

24. *Brown & Redpath*, of the Commercial-road, Limehouse, for an improved portable forge for ships, &c.

26. *John Brown & Son*, of Newcastle-upon-Tyne, for a chamber looking-glass.

List of Patents

That have passed the Great Seal of IRELAND, from the 20th November to 21st December, inclusive.

To Henry Constantine Jennings, of No. 6, Cumberland-terrace, Regent's-park, in the county of Middlesex, practical chemist, for a new method, apparatus, or machine, for the better or more economic evaporation of fluids or liquids, containing crystalline or other matters, to be concentrated or crystallized. —Sealed 24th November.

William Johnson, of Grosvenor Wharf, Millbank, in the city of Westminster, Gent., for certain improvements in machinery for raising or lifting and lowering weights or ponderous bodies. —Sealed 9th December.

Bartholomew Beniowski, of Bow-street, Covent-garden, in the county of Middlesex, Major in the late Polish Army, for certain improvements in the apparatus for and process of printing.—Sealed 9th December.

Pierre Armand le Comte de Fontainemoreau, of 15, New Broad-street, in the city of London, for certain improvements in producing artificial fuel.—Sealed 9th December.

William Eaton, of Newington, in the county of Surrey, engineer, for certain improvements in obtaining motive power.—Sealed 14th December.

List of Patents

Granted for SCOTLAND, subsequent to November 22nd, 1846.

To Edward Alfred Cowper, of Smethwick, near Birmingham, engineer, for improvements in the manufacture of railway chairs.—Sealed 25th November.

William Watson Pattinson, of Felling, near Gateshead, manufacturing chemist, for improvements in the manufacture of chlorine.—Sealed 25th November.

Charles Bertram, of Gateshead, engineer, for improvements in the manufacture of artificial fuel, and in the application of the residual products to useful purposes.—Sealed 25th November.

Thomas Wood Gray, of Workworth-terrace, Commercial-road, London, for improvements in ports, and in apparatus for opening and closing ports of ships or vessels; also applicable in opening and closing windows and other instruments having like movements.—Sealed 27th November.

Alfred Vincent Newton, of the Office for Patents, 66, Chancery-lane, London, mechanical draughtsman, for certain improvements to be applied to the grinding of grain and other substances,—being a foreign communication.—Sealed 8th December.

Sir James Caleb Anderson, of Buttevant Castle, Cork county, Ireland, Baronet, for certain improvements in obtaining motive power, and in applying it to propel carriages and vessels, and to the driving of machinery.—Sealed 9th December.

William Mathers Hall, of Leeds, brass-founder, for a certain improvement or certain improvements in and applicable to sliding gas pendants, lamps, lustres, and chandeliers.—Sealed 9th December.

William Johnson, of Grosvenor Wharf, Millbank, Gent., for certain improvements in machinery for raising or lifting and lowering weights or ponderous bodies.—Sealed 10th December.

William Johnson, of Grosvenor Wharf, Millbank, Gent., for certain improvements in propelling carriages on railways.—Sealed 14th December.

William Eaton, of Newington, Surrey, engineer, for certain improvements in obtaining motive power.—Sealed 14th December.

John Mercer, of Oakenshaw, in the county of Lancaster, chemist, and John Greenwood, of Church, in the same county, chemist, for certain improvements in dyeing and printing Turkey-red and other colors.—Sealed 16th December.

Bartholomew Beniowski, of Bow-street, Covent Garden, London, Major in the late Polish Army, for certain improvements in the apparatus for and process of printing.—Sealed 17th December.

John Todd, of Glasgow, engineer, and William Johnston, of Birmingham, engineer, for improvements in arranging the rails on certain parts of railways.—Sealed 21st December.

New Patents
SEALED IN ENGLAND.

To James Bullough, of Blackburn, in the county of Lancaster, machine-maker, and Adam Bullough, of the same place, overlooker, for certain improvements in looms for weaving. Sealed 1st December—6 months for inrolment.

Henry Bridges, of Croydon, Surrey, coach-maker, for certain improvements in railway wheels. Sealed 1st December—6 months for inrolment.

William Thomas, of Cheapside, city, merchant, for improvements in machinery for sewing or stitching various fabrics,—being a communication. Sealed 1st December—6 months for inrolment.

William Johnson, of Grosvenor wharf, Millbank, Westminster, Gent., for certain improvements in machinery for raising or lifting and lowering weights or ponderous bodies. Sealed 1st December—6 months for inrolment.

Richard Love, jun., of Coleman-street, city, merchant, for certain improvements in paving streets, roads, yards, and other surfaces, over which carriages and beasts of burden have to pass. Sealed 1st December—6 months for inrolment.

George Ellins, of Droitwich, in the county of Worcester, salt manufacturer, for certain improvements in apparatus for manufacturing salt. Sealed 1st December—6 months for inrolment.

Jacques François Pinel, of Lyons, in the kingdom of France, chemist, for improvements in grinding wheat and other grain. Sealed 1st December—6 months for inrolment.

Samuel Cunliffe Lister, of Manningham, in the county of York, manufacturer, for improvements in combing wool. Sealed 1st December—6 months for inrolment.

George Fergusson Wilson, of Belmont, Vauxhall, in the county of Surrey, Gent., and John Jackson, of Southville, Wandsworth-road, Gent., for improvements in the process of and apparatus for treating fatty and oily matters, and manufacturing candles and night lights. Sealed 1st December—6 months for inrolment.

William Mayo, of Silver-street, city, manufacturer of mineral waters, for improvements in the manufacture of aerated liquids, and in apparatus used for such manufacture, and when pumping other liquids; and also in bottling fluids. Sealed 1st December—6 months for inrolment.

William Johnson, of Grosvenor-wharf, Millbank, city of Westminster, Gent., for certain improvements in propelling carriages on railways. Sealed 2nd December—6 months for inrolment.

Thomas Craddock, of Birmingham, engineer, for improvements in steam-engines and boilers, and in machinery connected therewith. Sealed 3rd December—6 months for inrolment.

Joseph Bancroft Reade, of Stone Vicarage, Aylesbury, for certain improvements in inks, and the processes by which the same are manufactured, and the application of some of these processes to the production of certain salts. Sealed 3rd December—6 months for inrolment.

William Henry Fox Talbot, of Lacock Abbey, Wilts, Esq., for improvements in obtaining and applying motive power. Sealed 7th December—6 months for inrolment.

Edmund Morewood, of Thornbridge, in the county of Derby, merchant, and George Rogers, of Stearndale, in the same county, merchant, for improvements in the manufacture of iron into sheets, plates, and other forms; in coating iron, and in preparing iron for coating and other purposes. Sealed 7th December—6 months for inrolment.

Eugene Bazile, of Rouen, in the kingdom of France, manufacturer, for improvements in obtaining heat during the manufacturing of coke, and applying such heat to various purposes,—being a communication. Sealed 7th December—6 months for inrolment.

John Dacie, of Foxley-place, Kennington, Surrey, Gent., for an improved apparatus to be attached to boots and shoes for the purpose of protecting the wearer from splashes of mud in walking. Sealed 7th December—6 months for inrolment.

Samuel Clift, of West Bromwich, in the county of Stafford, Gent., for certain improvements in the distillation of tar and pitch. Sealed 8th December—6 months for inrolment.

Alexander Bain, of Hanover-street, Edinburgh, electrical engineer, for certain improvements in transmitting and receiving electrical telegraph communications, and in apparatus connected therewith. Sealed 12th December—6 months for inrolment.

Moses Poole, of the Bill Office, London, Gent., for improvements in the construction and working of electric telegraphs and in apparatus connected therewith, partly applicable to other purposes. Sealed 14th December—6 months for inrolment.

James Yates, of Masborough, in the parish of Rotherham, in the county of York, engineer, for improvements in the construction of blast furnaces. Sealed 14th December—6 months for inrolment.

John Keely jun., of Nottingham, dyer, for improvements in dressing or finishing lace and other fabrics. Sealed 14th December—6 months for inrolment.

William Longmaid, of St. Helens, in the county of Lancaster, Gent., for improvements in the manufacture of alkali and chlorine. Sealed 14th December—6 months for inrolment.

Elijah Galloway, of Buckingham-street, Strand, civil engineer, for improvements in rotary engines, and in locomotive carriages and railways. Sealed 14th December—6 months for inrolment.

John Shaw, of Blackburn, in the county of Lancaster, manager, for certain improvements in machinery or apparatus for carding, drawing, slubbing, and roving cotton, wool, and other fibrous substances. Sealed 14th December—6 months for inrolment.

James Carter, of Oldham, in the county of Lancaster, painter, for an improved lubricator. Sealed 14th December—6 months for inrolment.

Charles Ford, of Shelton, in the county of Stafford, engineer, for improvements in the manufacture of pottery or earthenware, and in the tools, instruments, or apparatus employed therein; part or parts of which improvements are applicable to other similar purposes. Sealed 14th December—6 months for inrolment.

Henry Bleasdale, of Chipping, in the county of Lancaster, roller maker, and William Ryder, of Bolton, in the same county, roller maker, for certain improvements in machinery or apparatus to be employed in the manufacture of rollers, used in machinery for preparing and spinning cotton and other fibrous substances. Sealed 14th December—6 months for inrolment.

John Todd, of Glasgow, engineer, and William Johnston, of Birmingham, engineer, for improvements in arranging the rails on certain parts of railways. Sealed 14th December—6 months for inrolment.

John Chubb, of St. Paul's Church-yard, City, for certain improvements in locks and latches to be used for fastenings. Sealed 14th December—6 months for inrolment.

Benjamin Vickers, of Sheffield, in the county of York, merchant, for an invention called the mechanical chirographer, or machine for delineating letters, figures, and other characters,—being a communication. Sealed 14th December—6 months for inrolment.

Jeremiah Campion, of Somers-place, Hyde Park, Gent., for improvements in soldiers' belts, and improvements to facilitate the carrying of knapsacks. Sealed 15th December—6 months for inrolment.

Thomas Friend Dickinson, of Newcastle-upon-Tyne, share broker, and John Falkous, of the same place, gas engineer, for certain improvements in gas-meters. Sealed 15th December—6 months for inrolment.

Mark Bingley, of Cannon-street, City, stationer, for improvements in bookbinding, and in weaving materials used in bookbinding; applicable also to other weavings; and in preparing for and making alphabets for account and other books, and in inking type therefor, and other purposes, and in preparing sprinkled granulated or mottled paper for bookbinders and others; applicable also to the edges of books, and in graining or chequering Russia and other leathers. Sealed 15th December—6 months for inrolment.

Richard Turner, of Hammersmith works, Dublin, and Bath place, New-road, Middlesex, for improvements in the construction of roofs of railway stations, and roofs and floors of other buildings. Sealed 15th December—6 months for inrolment.

Walter Smart, jun., of Leather-lane, Middlesex, lithographic printer, for a new or improved lithographic printing press. Sealed 21st December—6 months for inrolment.

John Watson, of Glasgow, manager to Messrs Gilmour & Kerr, power loom cloth manufacturers, for improvements in weaving, by Jacquard looms, by power. Sealed 21st December—6 months for inrolment.

Peter Borrie, of the Crescent, Minories, City, engineer, for improvements in the construction of piers and harbours. Sealed 21st December—6 months for inrolment.

John Jennings, of Ollerton, in the county of Chester, farmer, for certain improvements in machinery or apparatus for threshing. Sealed 21st December—6 months for inrolment.

Richard Boyse Osborne, of Limerick, in Ireland, civil engineer, for certain improvements in bridges, roofing, and flooring,—being a communication. Sealed 21st December—6 months for inrolment.

Louis Sylvain Gonin, manufacturer, of Paris, for improvements in printing stuffs, paper, and other matters. Sealed 21st December—6 months for inrolment.

Moses Poole, of the Bill Office, London, Gent., for means and apparatus for administering certain matter to the lungs for medical or surgical purposes,—being a communication. Sealed 21st December—6 months for inrolment.

Joseph Whitworth, of Manchester, engineer, for improvements in machinery for knitting. Sealed 21st December—6 months for inrolment.

Augustus Applegarth, of Dartford, Kent, calico printer, for improvements in machines for printing paper and other fabrics. Sealed 21st December—6 months for inrolment.

Moses Poole, of the Bill Office, London, Gent., for improvements in steam-engines and in machinery for propelling machinery and fluids,—being a communication. Sealed 21st December—6 months for inrolment.

Antoine Perpigna, of Paris, advocate, for certain improvements in machinery for platting and braiding,—being a communication. Sealed 21st December—6 months for inrolment.

John Perry, of Leicester, wool-comb manufacturer, and James Noble, of the same place, wool-comber, for certain improvements in combing wool, and in preparing wool for combing and carding. Sealed 21st December—6 months for inrolment.

Pierre Frederic Gougy, of Leicester-square, in the county of Middlesex, Gent., for improvements in apparatus and machinery for raising, lifting, and otherwise moving heavy bodies. Sealed 23rd December—6 months for inrolment.

CELESTIAL PHENOMENA FOR JANUARY, 1847.

D.	H.	M.	
1			Clock before the ☉ 3m. 43s.
			☽ rises 4h. 31m. A.
			☽ passes mer. 0h 22m. M.
			☽ sets 7h. 24m. M.
			☉ in perigee
—			Occul. λ Geminorum, im. 14h. 9m. em. 15h. 17m.
	2	42	Ecliptic oppo. or ○ full moon.
1	14	20	♃'s first sat. will em.
2	8	56	Vesta in □ with the ☉
3			Occul. A2 Cancri, im. 7h. 26m. em. 7h. 58m.
3	8	49	♃'s first sat. will em.
—			Occul. *a*1 Cancri, im. 12h. 53m. em. 13h. 35m.
5			Clock before the sun, 5m. 34s.
—			☽ rises 8h. 40m. A.
—			☽ passes mer. 2h. 14m. M.
—			☽ sets 9h. 35m. M.
6	6		☽ in Apogee
6	18	12	☿ in conj. with Juno, diff. of dec. 9. 17. S.
7	11	11	♃'s second sat. will em.
9			Occul. *k* Virginis, im. 13h. 4m. em. 13h. 43m.
9	6	40	☽ in □ or last quarter
10			Clock before the sun, 7m. 42s.
—			☽ rises 0h. 15m. M.
—			☽ passes mer. 6h. 15m. M.
—			☽ sets 11h. 30m. M.
	4	8	Ceres stationary
	5	27	♃'s third sat. will im.
	7	53	♃'s third sat. will em.
10	10	44	♃'s first sat. will em.
11	21	20	Pallas in conj. with ♅ diff. of dec. 19. 59. S.
12	5	13	♃'s first sat. will em.
13	5	4	♀ in Aphelion
	7	6	♂ in conj. with the ☽ diff. of dec. 3. 37. S.
	13	52	☿ in the descending node
14	13	47	♃'s second sat. will em.
15			Clock before the sun, 9m. 37s.
—			☽ rises 6h. 10m. M.
—			☽ passes mer. 10h. 36m. M.
—			☽ sets 3h. 3m. A.
17			Mercury R. A. 18h. 37m. dec. 23. 36. S.
—			Venus R. A. 20h. 28m. dec. 20. 21. S.
—			Mars R. A. 16h. 47m. dec. 22. 22. S.
—			Vesta R. A. 13h. 10m. dec 1. 11. N.
—			Juno R. A. 17h. 49m. dec. 13. 1. S.
—			Pallas R. A. 0h. 45m. dec. 15. 55. S.
—			Ceres R. A. 3h. 15m. dec. 15. 32. N.
—			Jupiter R. A. 4h. 20m. dec. 20. 53. N.
—			Saturn R. A. 22h. 7m. dec. 13. 10. S.
—			Georg. R. A. 0h. 40m. dec. 3 38. N.
—			Mercury passes mer. 22h. 54m.
—			Venus passes mer. 0h. 43m.
—			Mars passes mer. 21h. 1m.
—			Jupiter passes mer. 8h. 34m.
—			Saturn passes mer. 2h. 21m.
—			Georg. passes mer. 4. 54.
17	0	45	Ecliptic conj. or ● new moon
17	4	52	♀ in conj with the ☽ diff. of dec. 6. 20. S.
	9	28	♃'s third sat. will im.
	12	40	♃'s first sat. will em.
18	3		☽ in Perigee
18	20	53	♄ in conj. with the ☽ diff. of dec. 5. 46. S.
19	4	22	♂ in the descending node
	7	9	♃'s first sat. will em.
20			Clock before the sun 11m. 15s.
—			☽ rises 9h. 25m. M.
—			☽ passes mer. 3h. 22m. A.
—			☽ sets 9h. 30m. A.
21	14	59	♅ in conj. with the ☽ diff. of dec. 1. 46. S.
23	4	18	☽ in □ or first quarter
23	17	35	☿ in Aphelion
24	13	29	♃'s third sat. will im.
24	14	35	♃'s first sat. will em.
25			Clock before the sun 12m. 35s.
—			☽ rises 0h. 1m. A.
—			☽ passes mer. 7h. 43m. A.
—			☽ sets 2h. 28m. M.
—			Occul. A.S.C. 454, im. 6h. 16m. em. 7h. 19m.
	5	41	♃'s second sat. will em.
—			Occul. δ1 Tauri, im. 14h. 14m. em. 15h. 5m.
	16		♃ in conj. with the ☽ diff. of dec. 2. 58. N.
—			Occul. δ2 Tauri, im, 14h. 42m. em. 15h. 34m.
26	9	4	♃'s first sat. will em.
29			Occul. *k* Geminorum, im. 2h. 41m. em. 3h. 26m.
30			Occul. *A*2 Cancri, im. 16h. 21m. em. 17h. 21m.
31	5	51	♃ stationary
	8	29	Ecliptic oppo. or ○ full moon

J. LEWTHWAITE, Rotherhithe.

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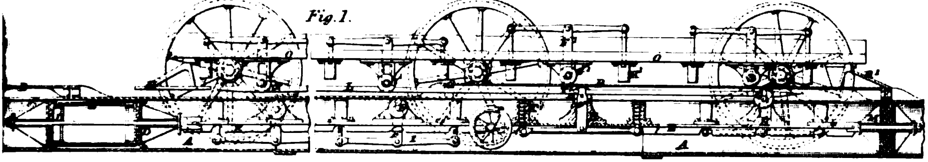

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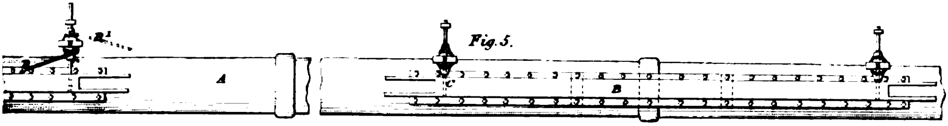

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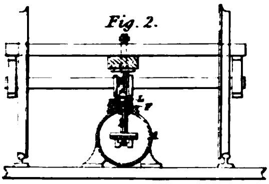

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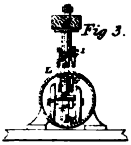

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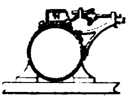

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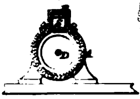

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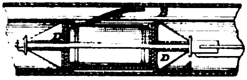

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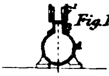

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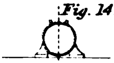

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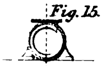

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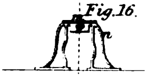

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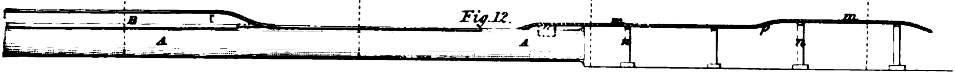

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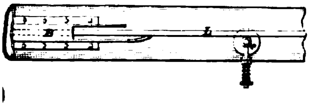

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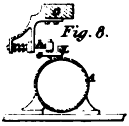

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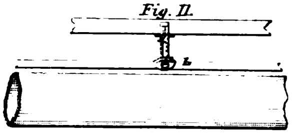

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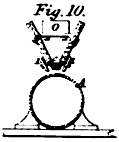

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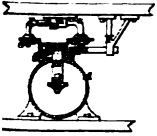

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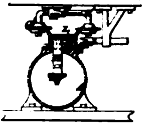

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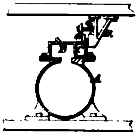

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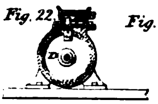

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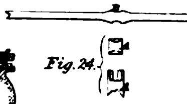

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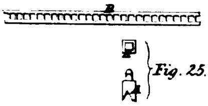

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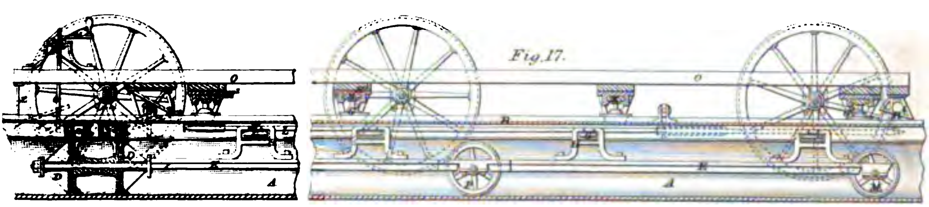

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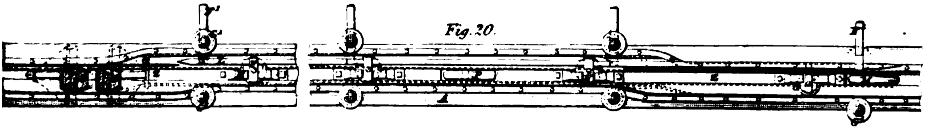

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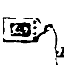

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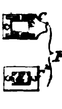

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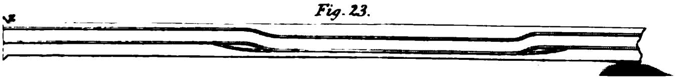

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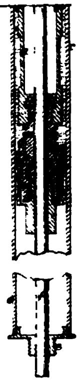

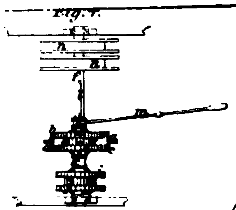

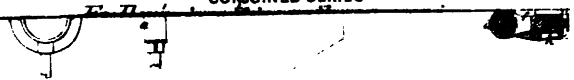

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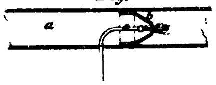
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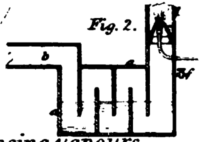
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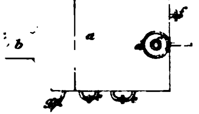
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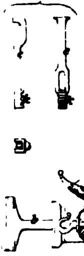
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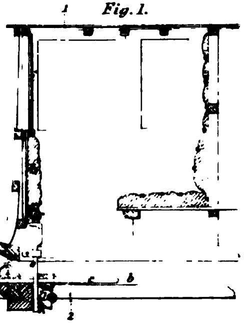
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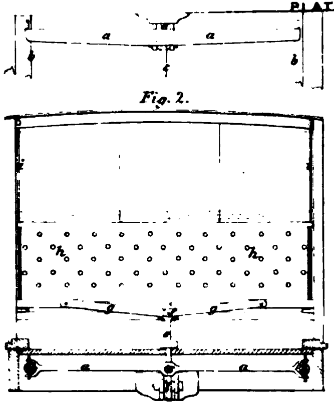
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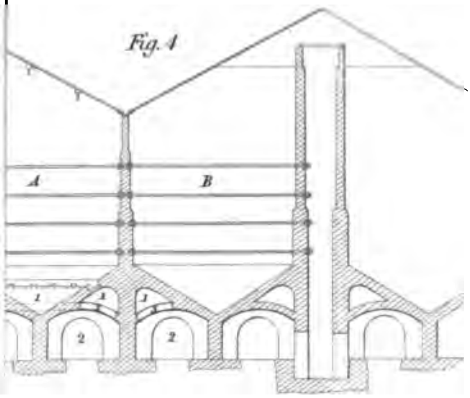

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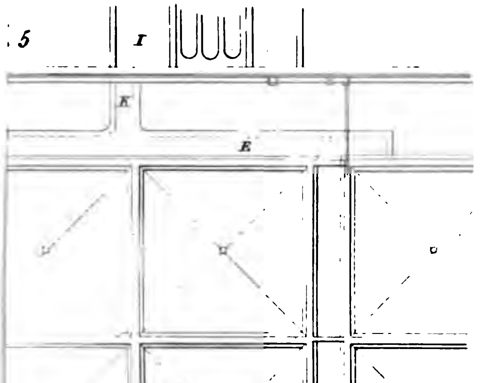
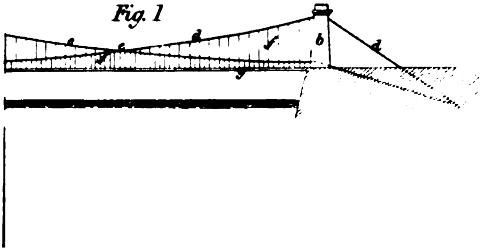
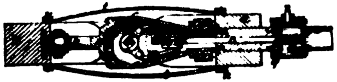


Fig. 1



Hays' imp^{ts} in propelling Veſsels.

Fig. 3.



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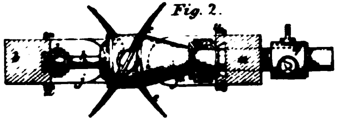

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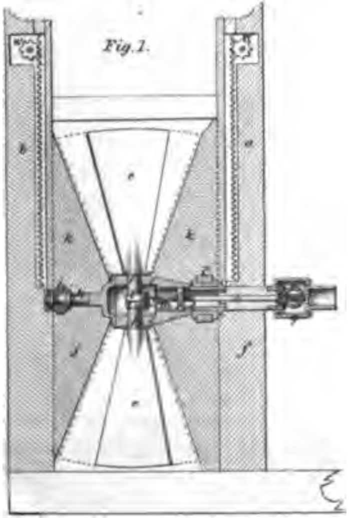

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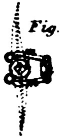

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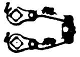

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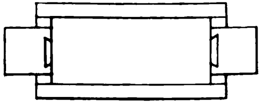

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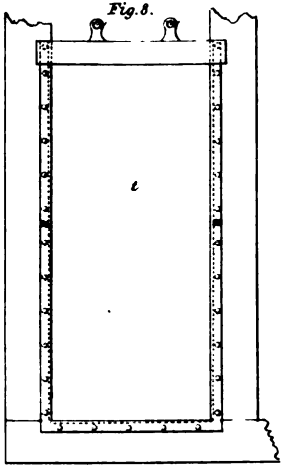

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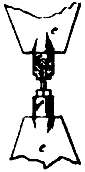

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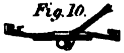

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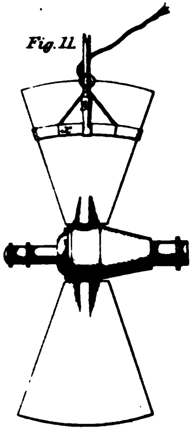

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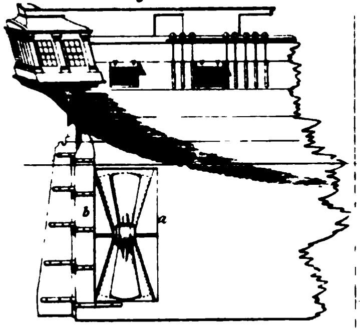
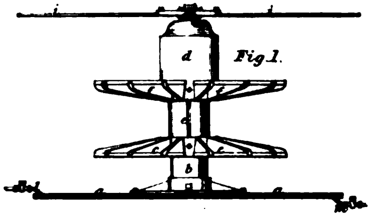


Hendries imp^{ts} in dreſsing silk.

Fig. 1.



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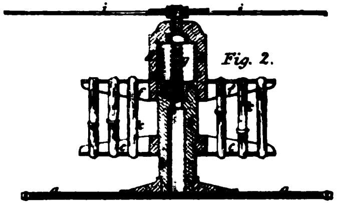
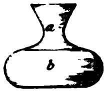


Davis' lamp shades.

Fig. 1.



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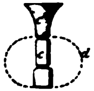

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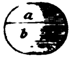

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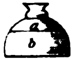

Newton del.

1st Sept^{r} 1846.

J. E. Wool s.

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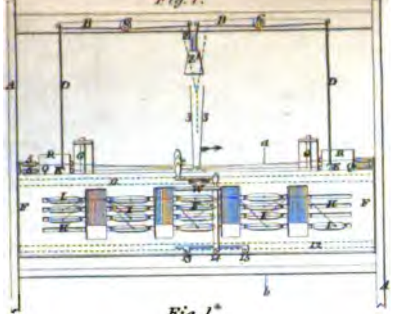
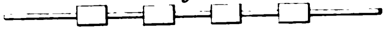


Fig. 1.*



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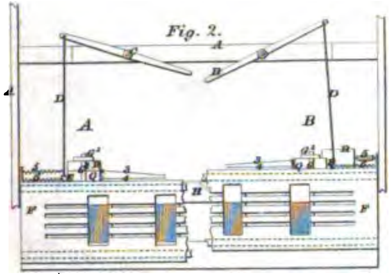


Fig. 3.

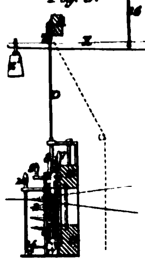
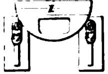


Fig. 6.

Fig. 8.



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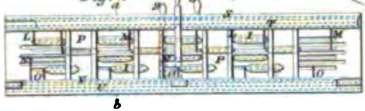

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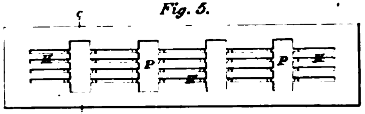

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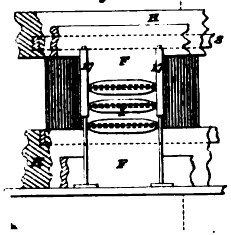

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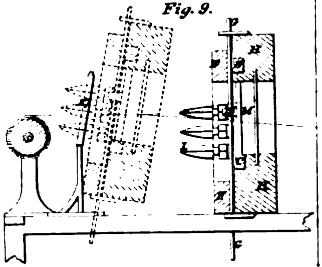

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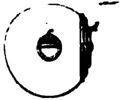

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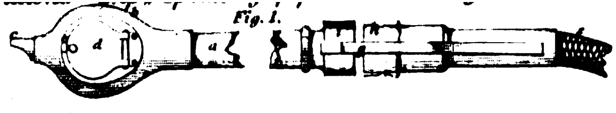

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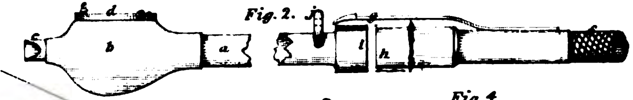

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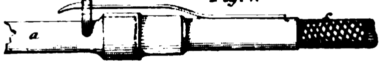
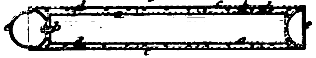


Dell's imp.d heating app.ts

Fig. 1.



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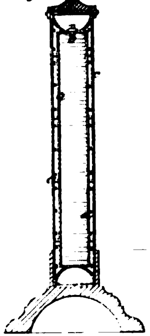

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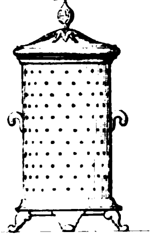

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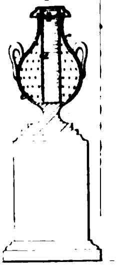


Benbow's imp.d fastenings.

Fig. 1.

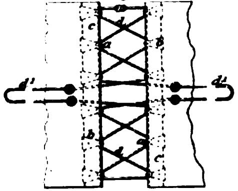
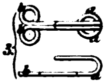


Fig. 2.

Fig.s 3.



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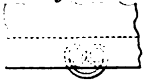
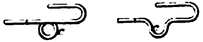


Fig. 5.

Fig.s 4.



Hall's steam-engine.

Fig. 1.

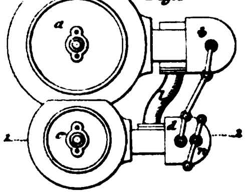
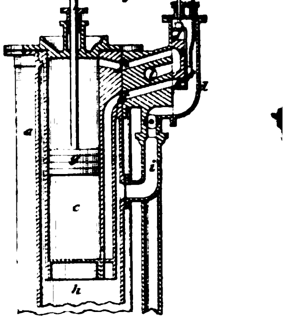
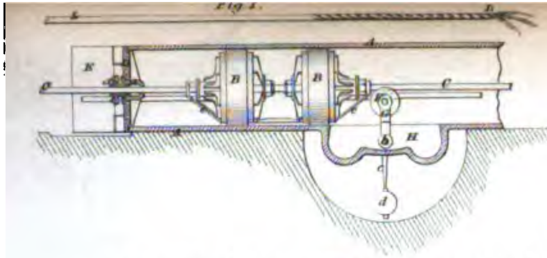


Fig. 2.



Nasmyth's imp^{ts} in atmospheric railways.

Fig. 1.



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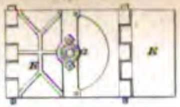

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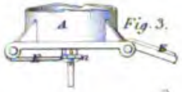

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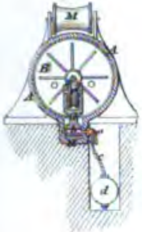

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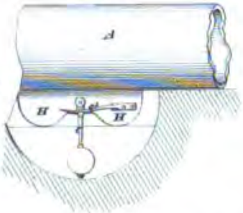

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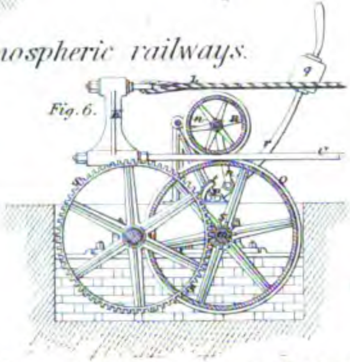

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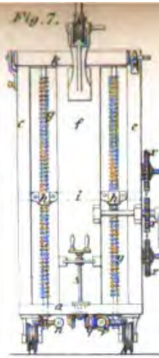

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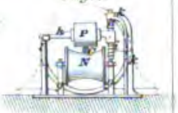

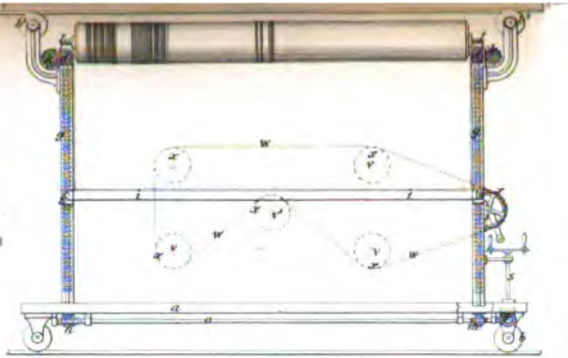

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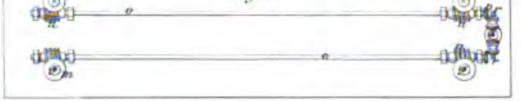

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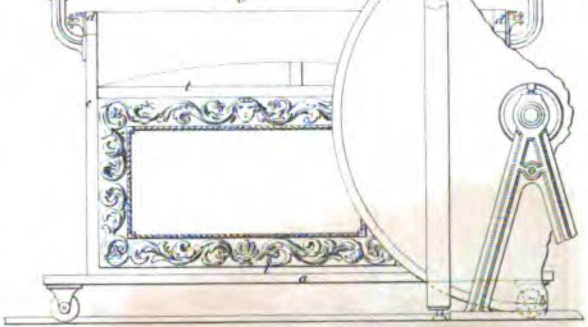

Taylor's imp^{ts} in making piled fabrics.

Fig. 2.

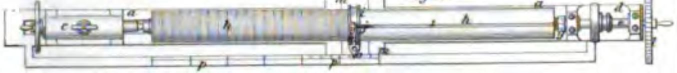

Fig. 4.

Fig. 3.

Fig. 1.

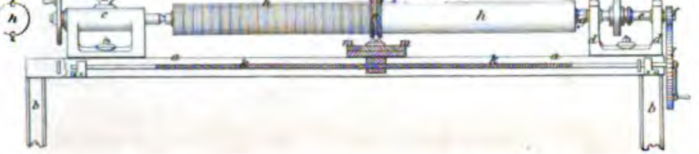

Fig. 5.

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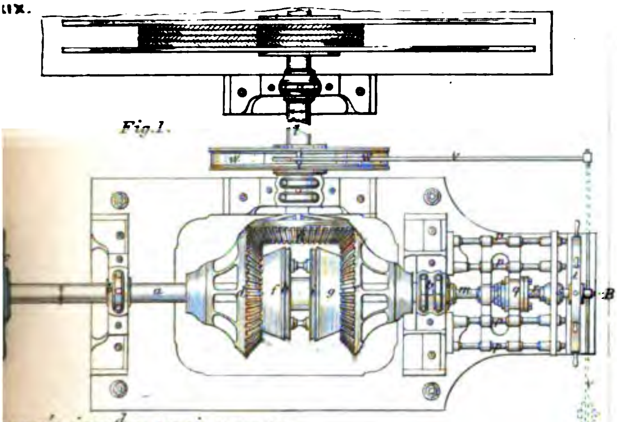
Fig. 1.



son's imp^d reversing gear.

Fig. 2.

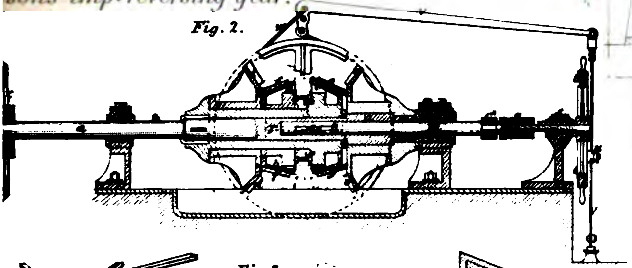
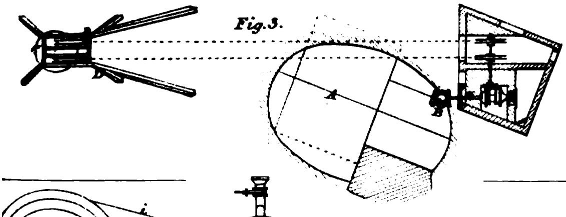
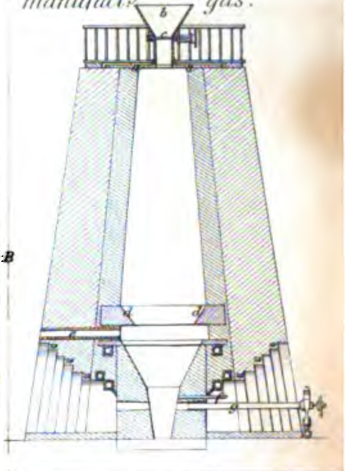


Fig. 3.

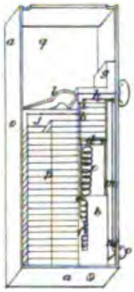


Constable's imp^ts in manufact^g gas.



Schlofs' match box.

Fig. 1.



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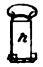

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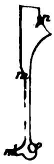
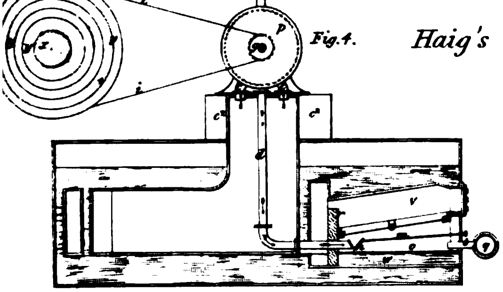


Haig's imp^ts in furnaces.

Fig. 4.



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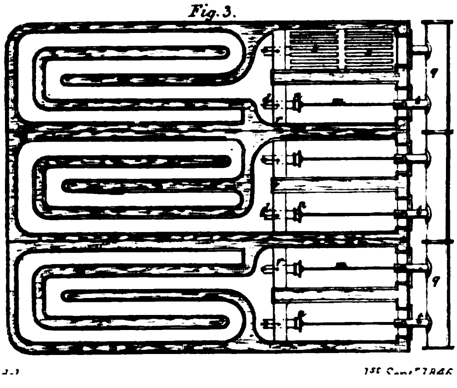

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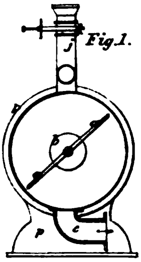

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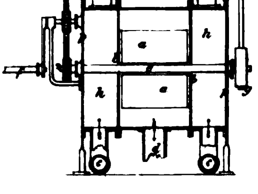

Newton del.

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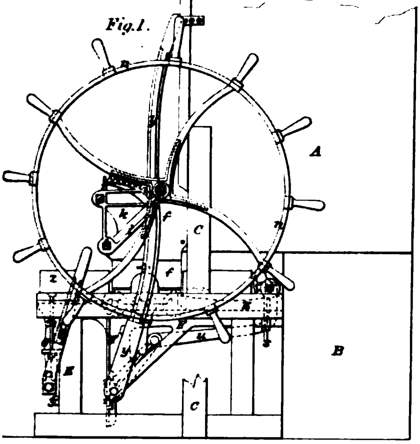
Hall's impd brick machine.

Fig. 1.



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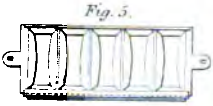

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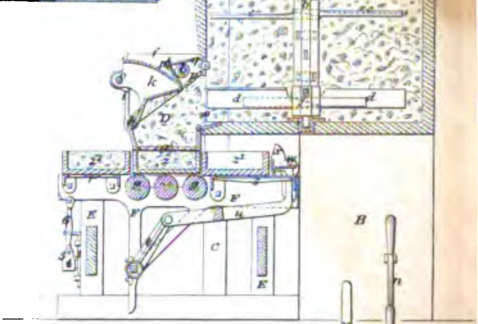

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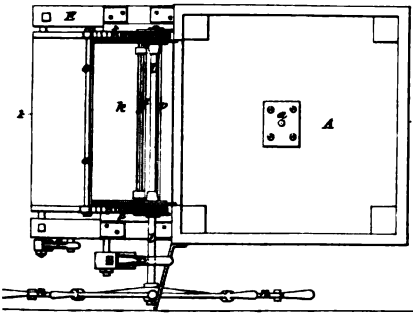

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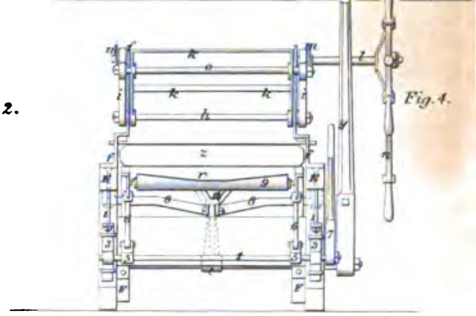
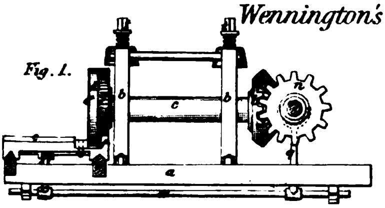


Wennington's impts in cutting sheet iron.

Fig. 1.



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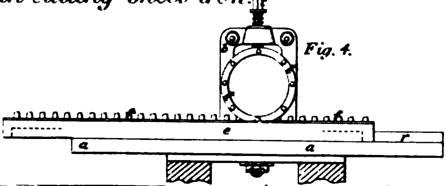
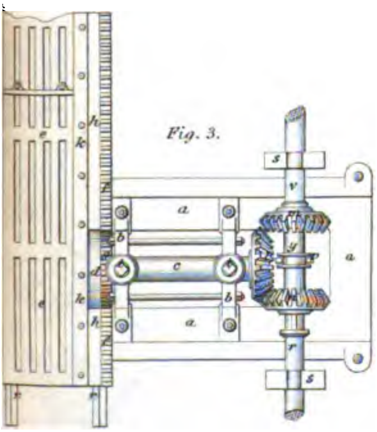
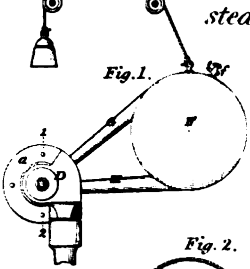


Fig. 3.

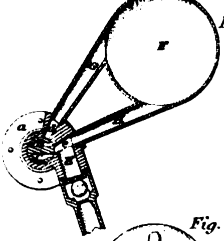


Lord's appts for supplying steam Boilers.

Fig. 1.



Fig



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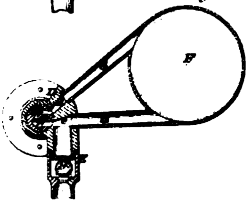
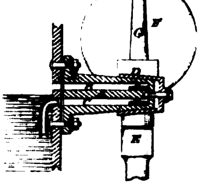


Fig. 3.



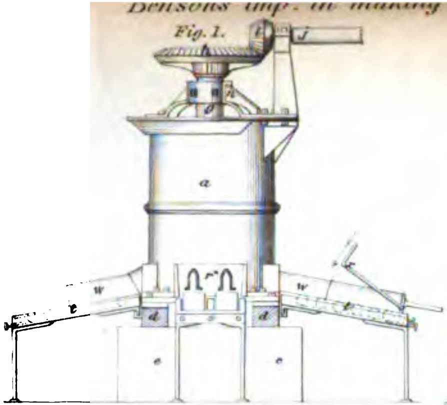
ewton del.

1st Octr 1846.

N

Bensons impt. in making drain tiles.

Fig. 1.



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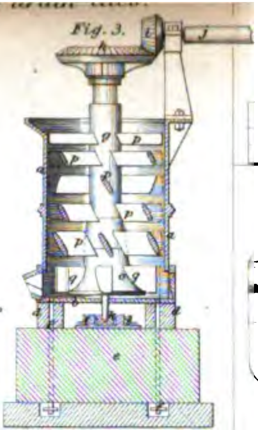

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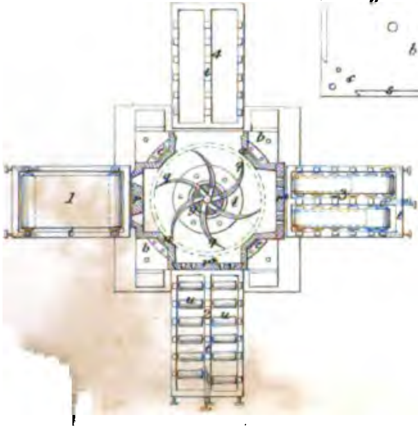

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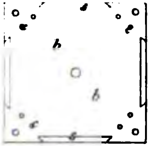

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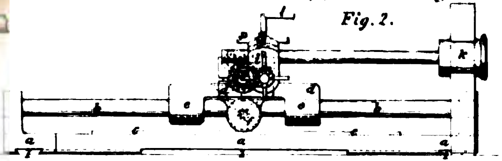

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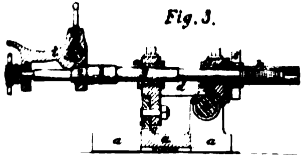

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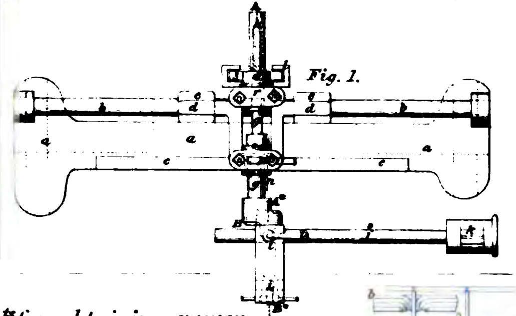

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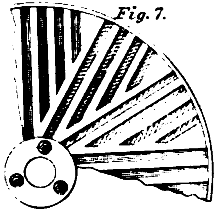

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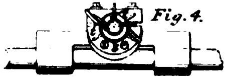
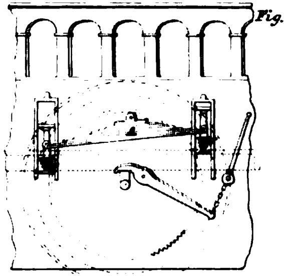


Fig. 5.

Fig. 6.

Campin's appts. for obtaining power.

Fig. 1.



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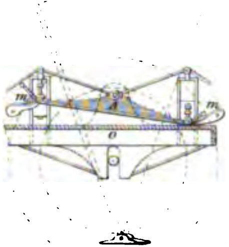

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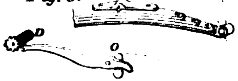

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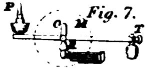
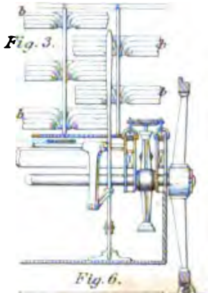


Fig. 3.



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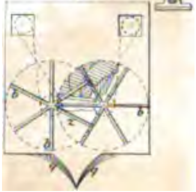

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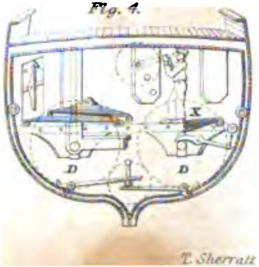

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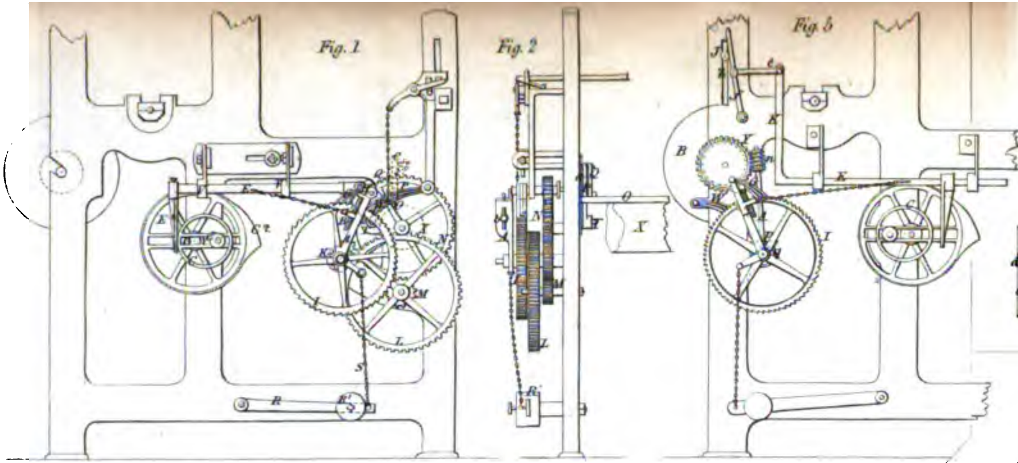
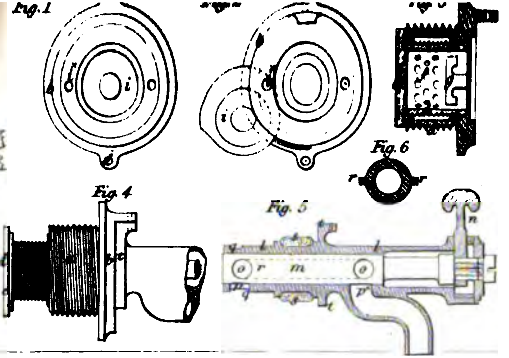
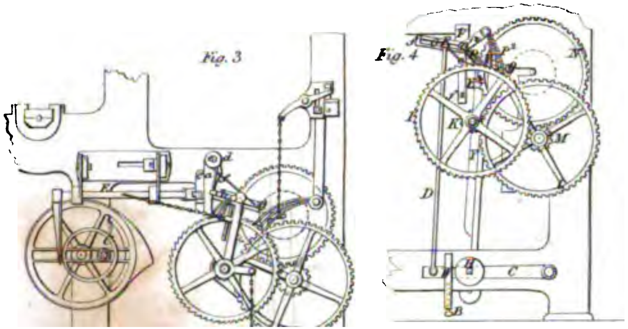
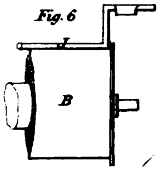




Russel's imp^{d} tiles





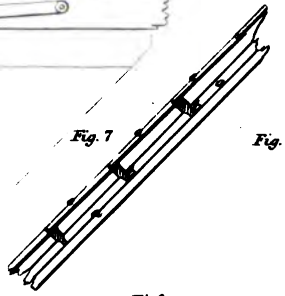
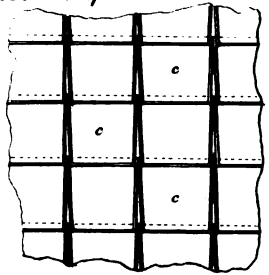


Fig. 7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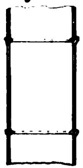
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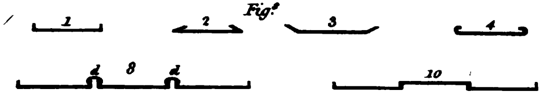
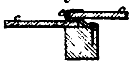


Fig.^{s}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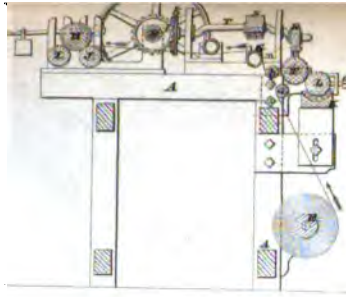

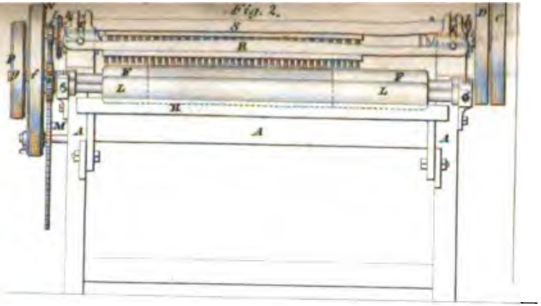
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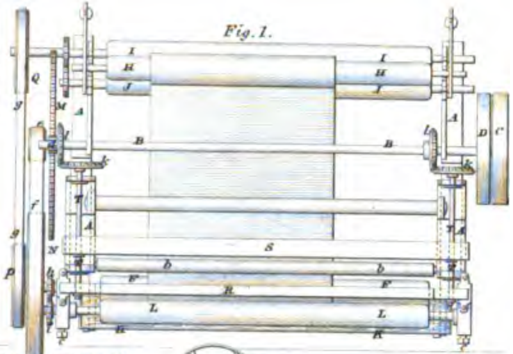
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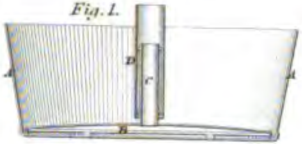
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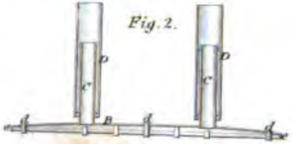
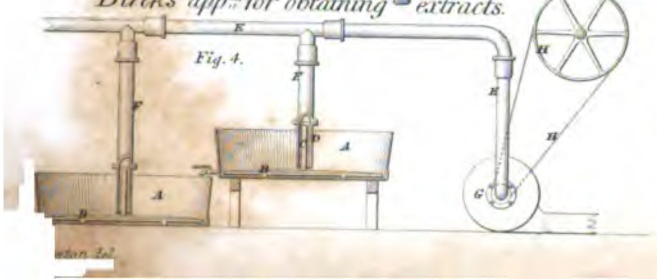


Fig. 2.

Dircks' app^ts. for obtaining extracts.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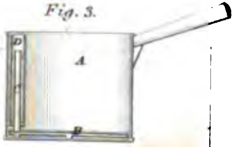


Fig. 3.

...ton del.

1st Novr. 1846.

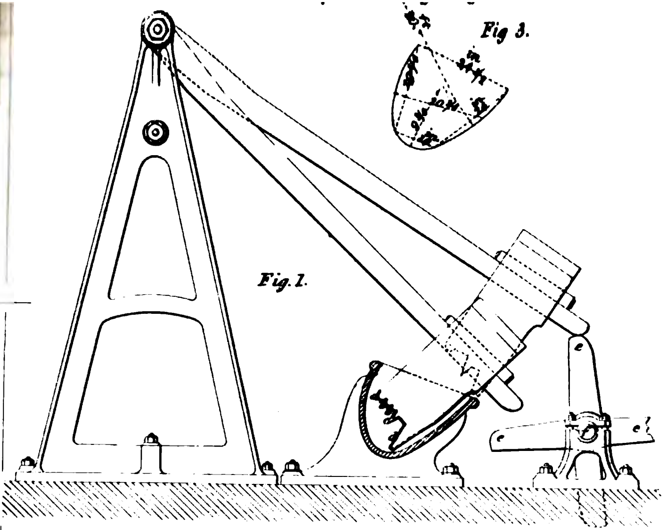


Fig. 1.

Fig 3.

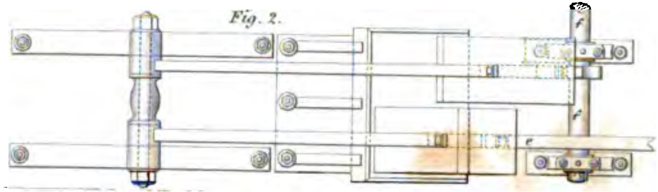
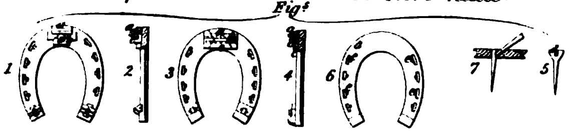


Fig. 2.

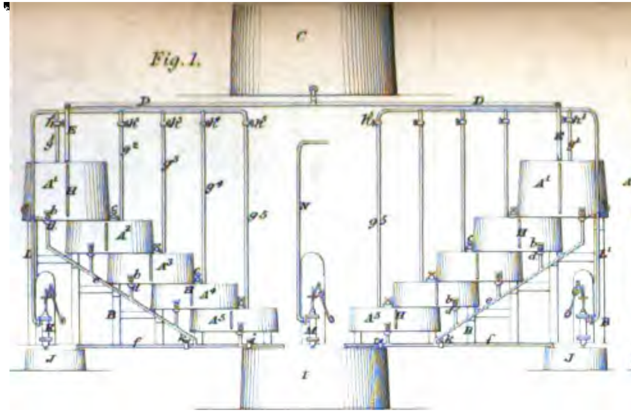
Vaux's imp^d. horse-shoes & horse-shoe nails.

Fig^s.



W.A. Beever sc.

Fig. 1.



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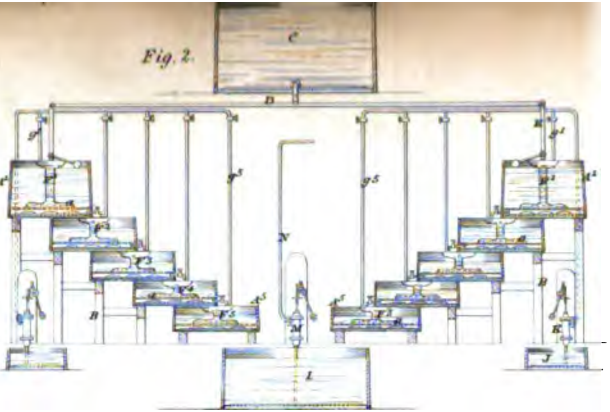

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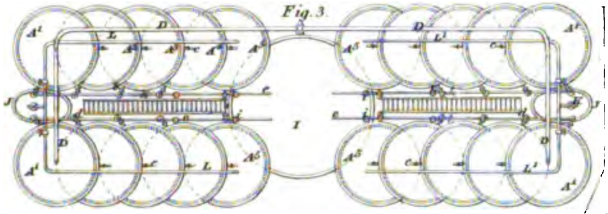

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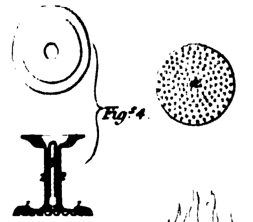

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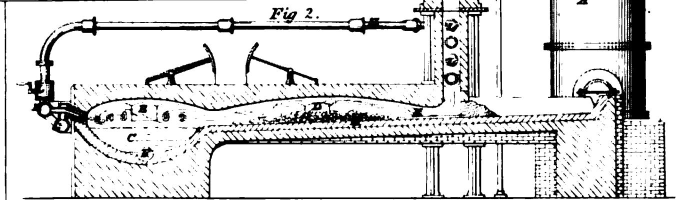
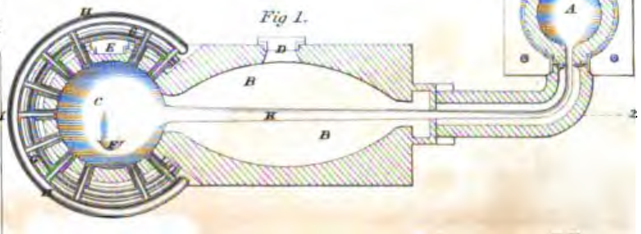


Heath's impts in making cast steel.

Fig 1.



Thompson & Wright's impts in propelling.

Fig. 3.

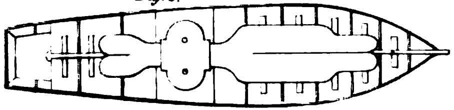
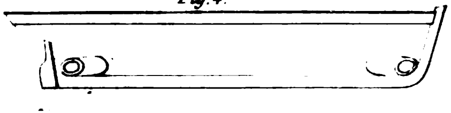


Fig. 4.



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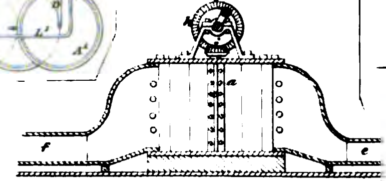
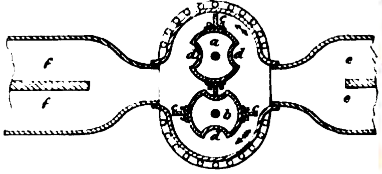


Fig. 1.



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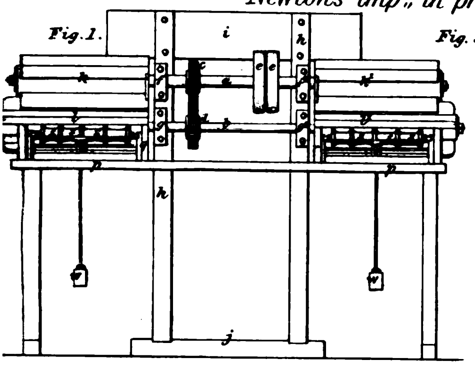
Newton's impts. in preparing thread.

Fig. 1.



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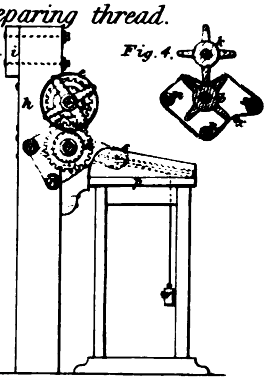
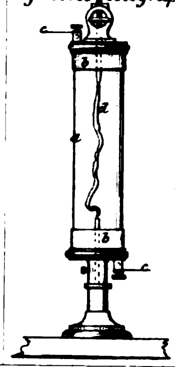


Fig. 4.

Highton's telegrapi



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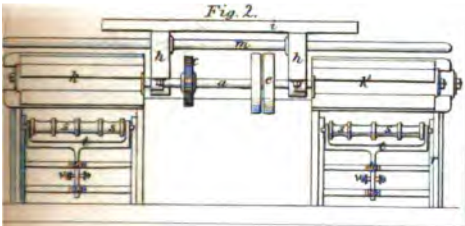
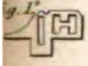


Fig. 1*



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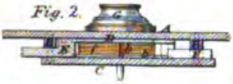
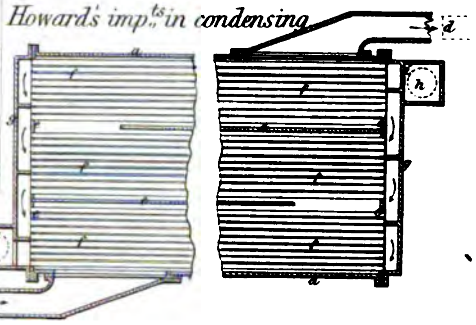
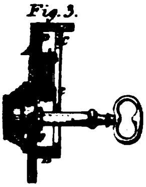


Howard's impts. in condensing.



Smith's improved locks.

Fig. 3.



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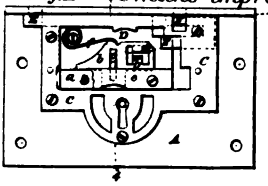
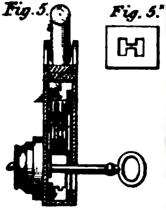


Fig. 5. Fig. 5*



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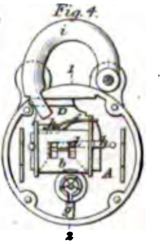

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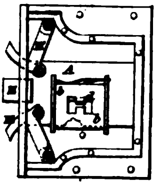

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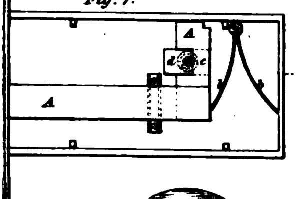


Fig. 9*

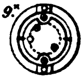


Fig. 10*

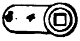
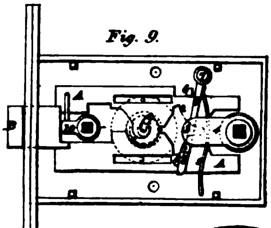


Fig. 9.



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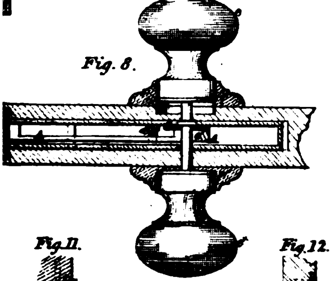

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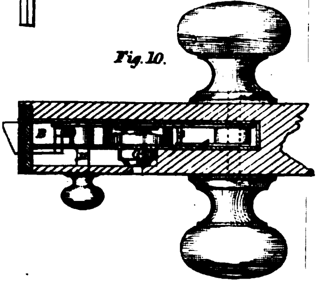

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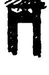
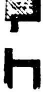
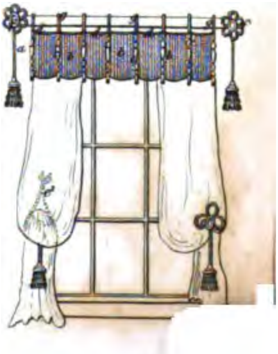


Fig. 12.



Pemberton's impd. window furniture.

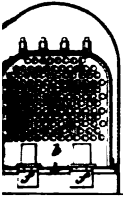


wton del.

1st Nov.r 1846.

Dewrance's impts. in steam boilers & in bearings.

Fig. 2.



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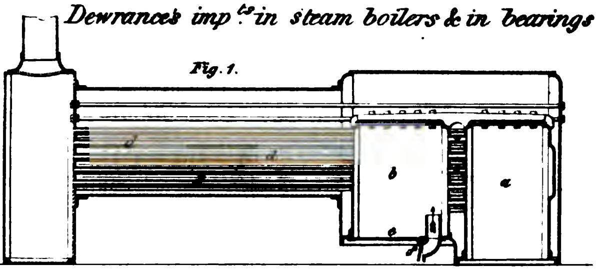

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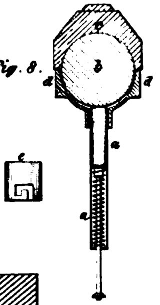
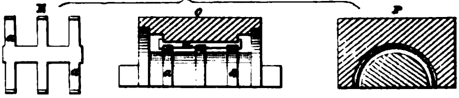


Figs. 3.

Fig. 7.



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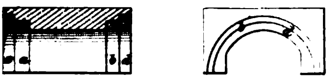

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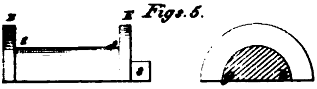

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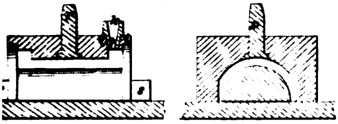


Bickford, Smith, & Davey's impd. fusees.

Fig. 3.

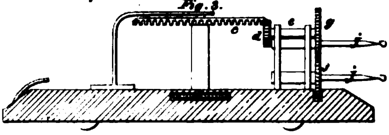
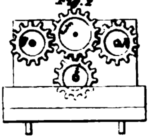


Fig. 2



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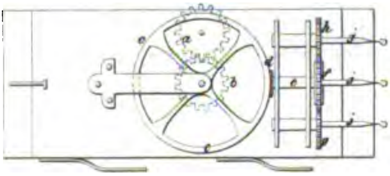

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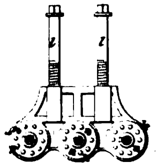

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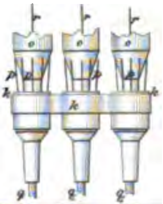

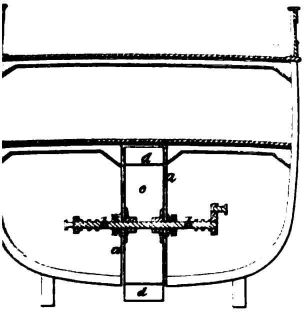

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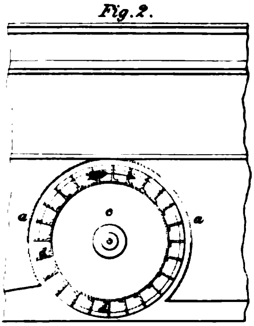
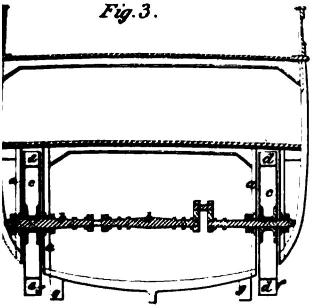


Thompson's impts. in propelling

Fig. 3.



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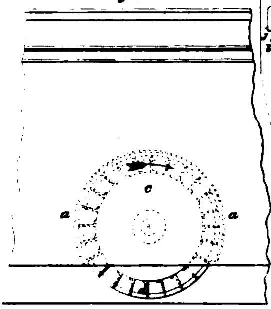


Dreschke's impd. Key-board.

Fig. 1.

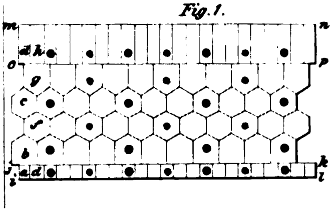
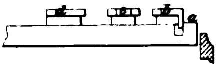


Fig. 2



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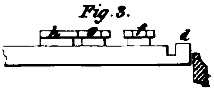

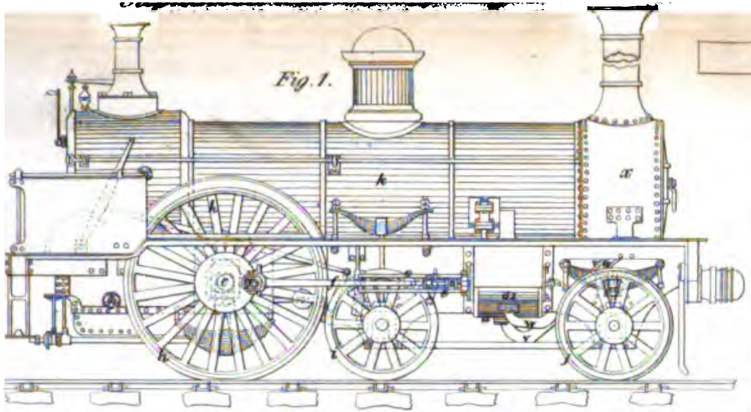
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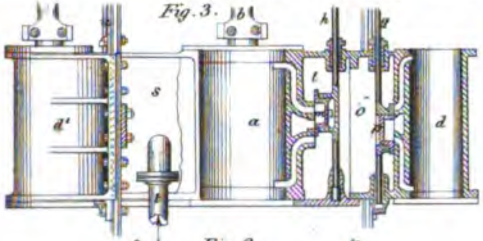
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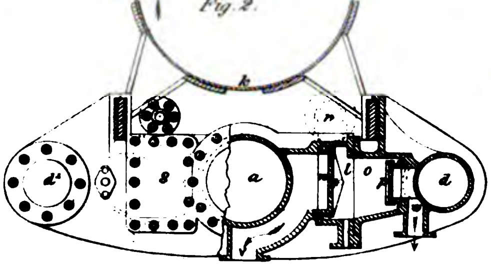
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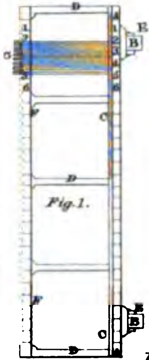


Fig. 1.

Fig. 2.

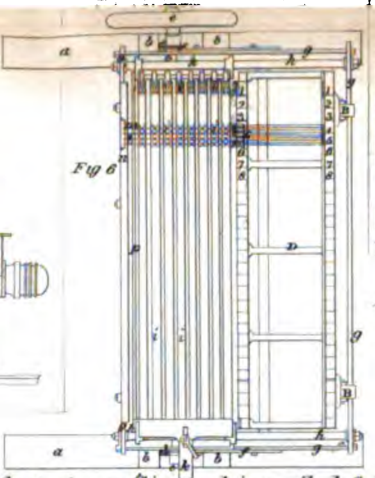
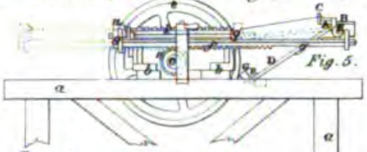


Fig 6

Newton's impts in making piled fabrics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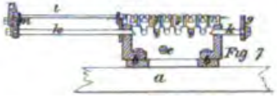
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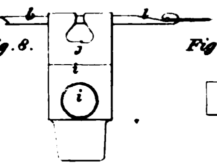
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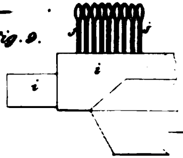
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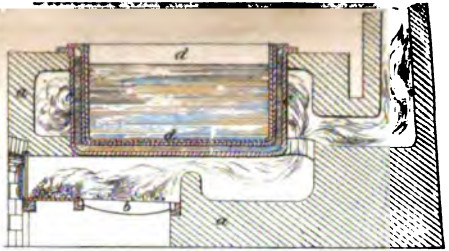

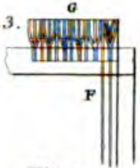
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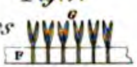
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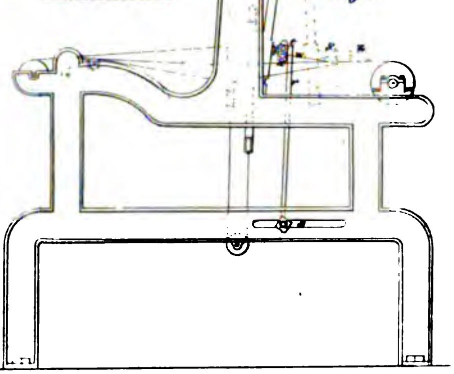


Fig. 10.

Newton's imp^{ts} in making India rubber fabrics

Fig. 1.

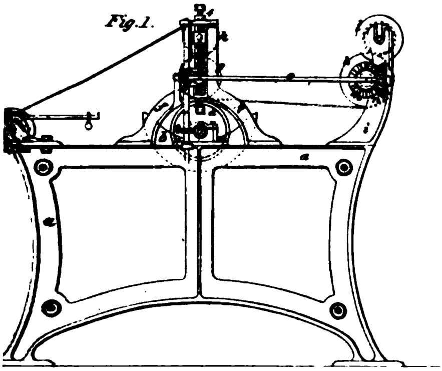
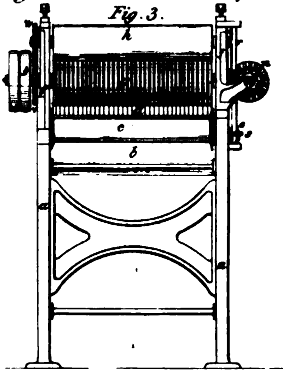


Fig. 3.



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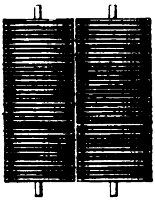

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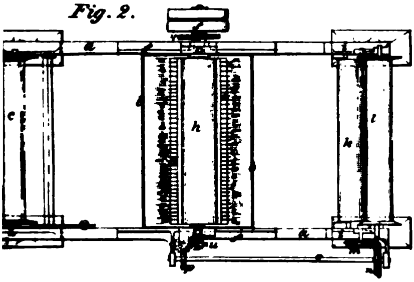

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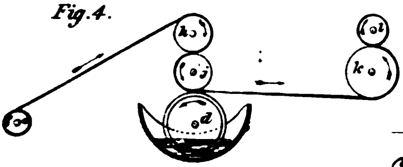

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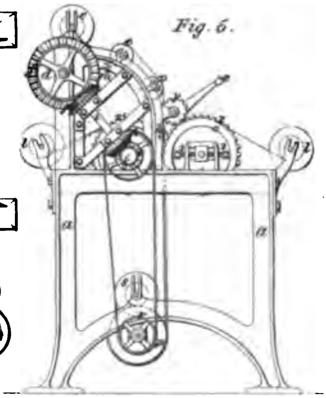

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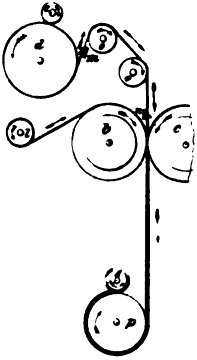

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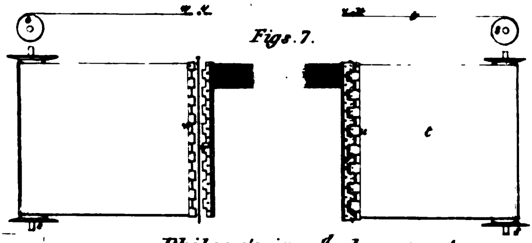
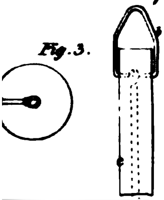


Wells' imp^{d} jacks, &c.

Fig. 3.



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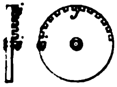

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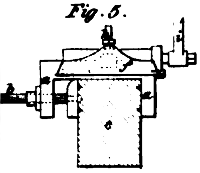

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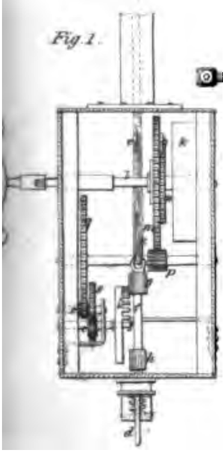

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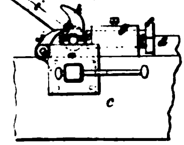
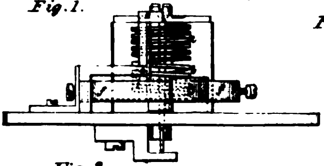


Philcox's imp^{d} chronometer.

Fig. 1.



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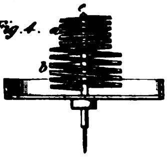

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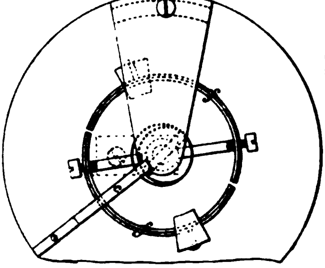

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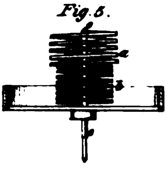

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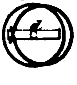
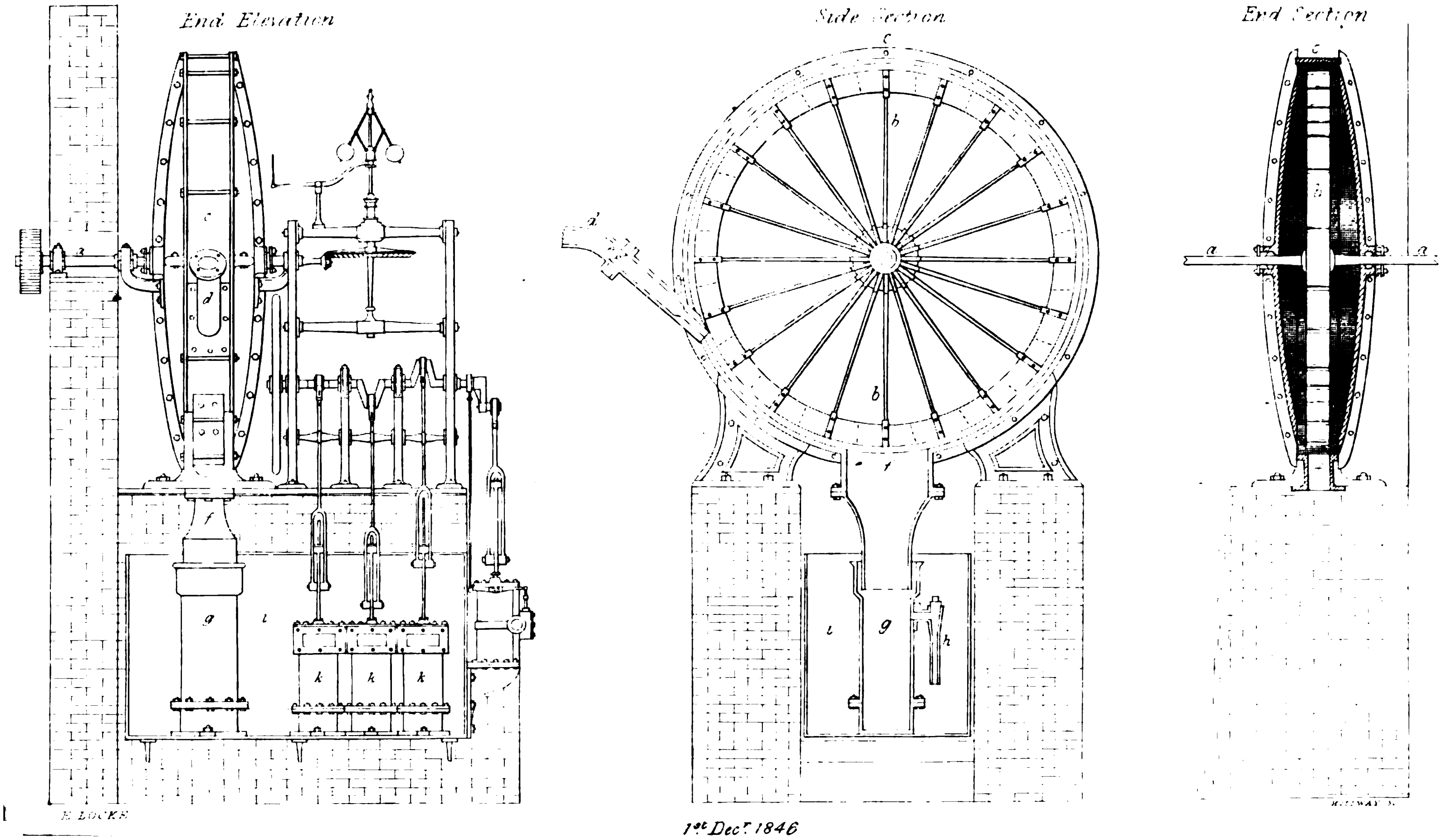


CORDES & LOCK'S STATIONARY ENGINE



1st Decr 1846

Nott's imp$^{ts}_{"}$ in electric telegraphs.

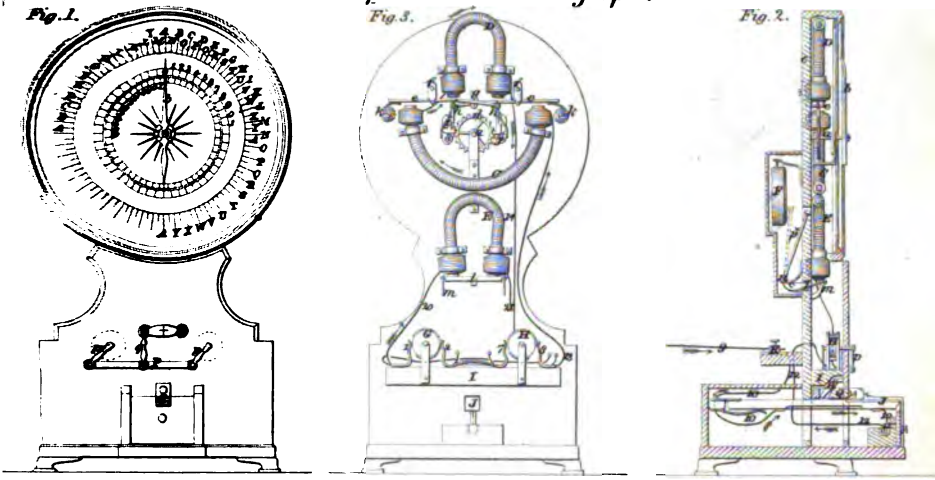


Fig. 1.

Fig. 3.

Fig. 2.

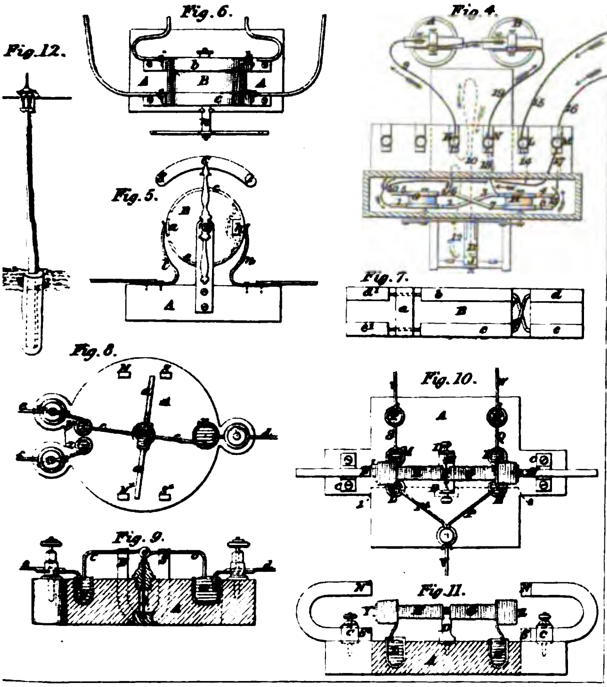


Fig. 12.

Fig. 6.

Fig. 4.

Fig. 5.

Fig. 7.

Fig. 8.

Fig. 10.

Fig. 9.

Fig. 11.

Green & Walker. app$^{ts}_{"}$ for putting on boots.

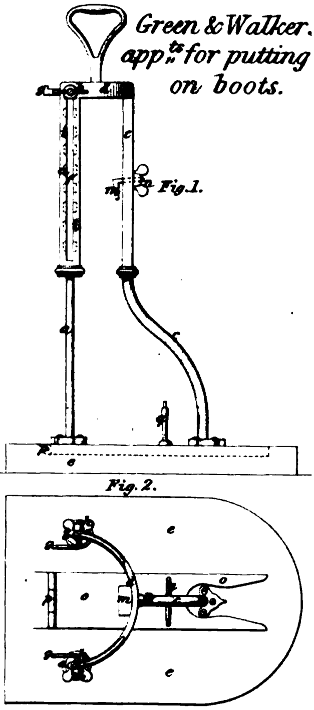


Fig. 1.

Fig. 2.

Aitken's imp$^{d}_{"}$ cornice poles, &c.

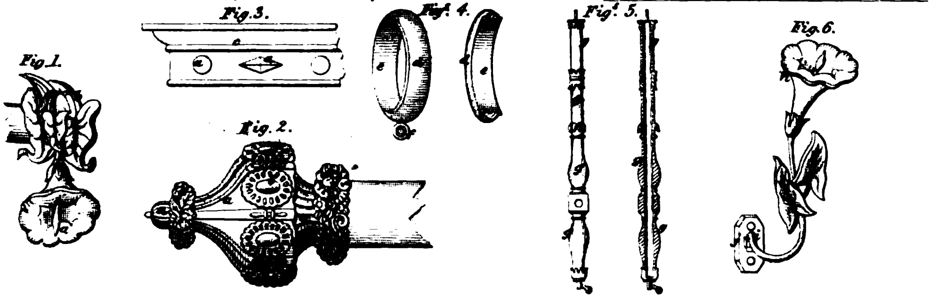


Fig. 1.

Fig. 3.

Fig^{s}. 4.

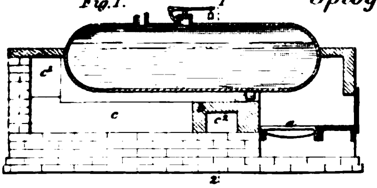
Fig^{s}. 5.

Fig. 6.

Fig. 2.

Spiby's imp.d furnaces.

Fig. 1.



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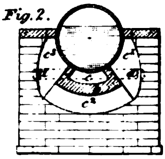

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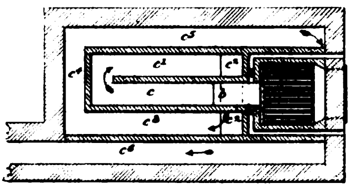

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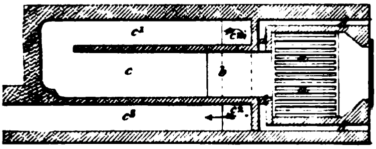
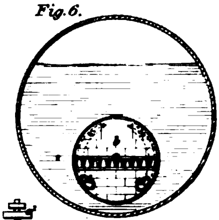


Fig. 6.



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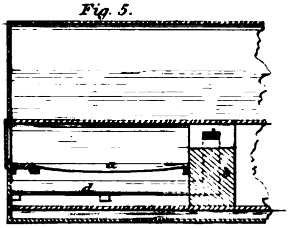

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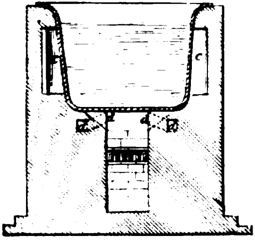

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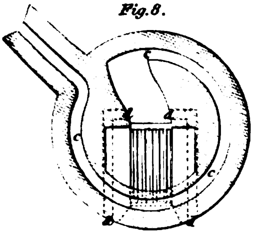
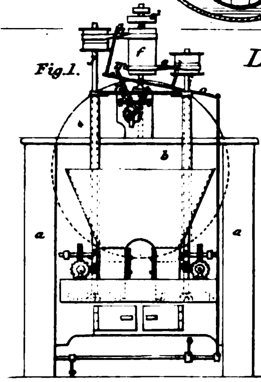


Dean's imp.d furnace.

Fig. 1.



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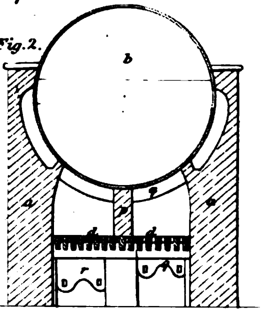

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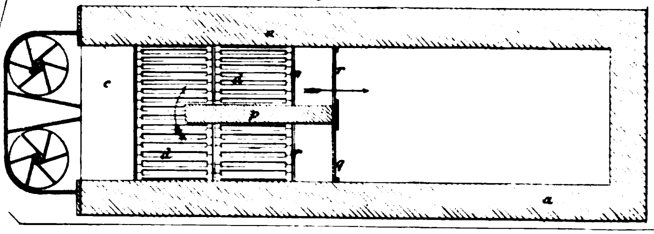


aylor's imp.ts in grinding.

Fig. 1.

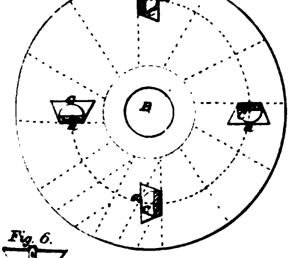
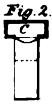


Fig. 2.a



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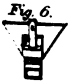

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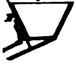
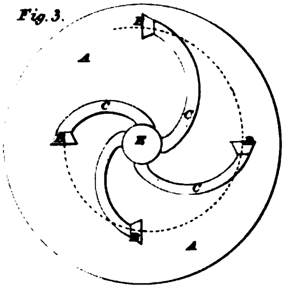


Fig. 3.



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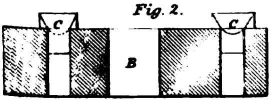
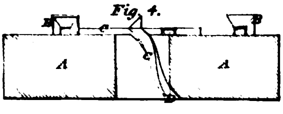


Fig. 4.



Potter's imp.ts in printing

Fig. 1.

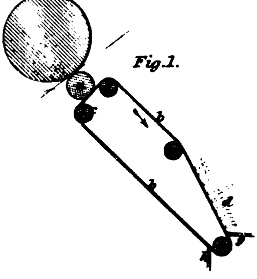
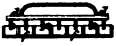


Fig. 2.



Scholefield's imp^{ts} in lithographic printing.

Fig. 1.

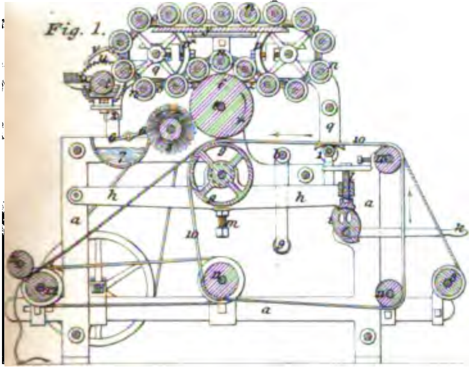


Fig 2.

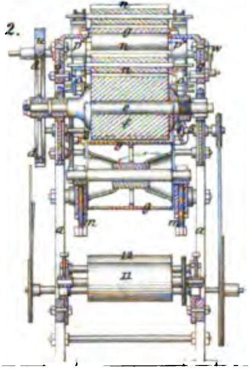
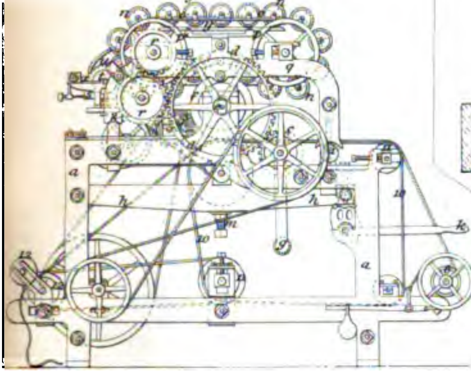


Fig. 3.



Blyth's imp^{d} inkstand.

Fig. 4.

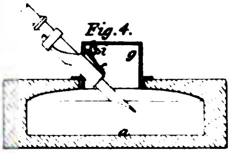


Fig. 1.

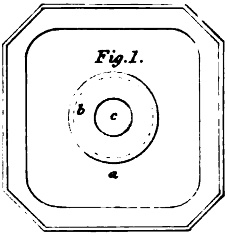


Fig. 2.

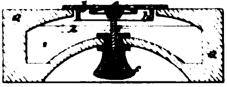


Fig. 3.

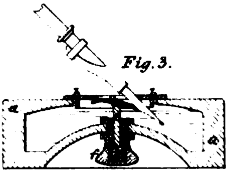


Fig. 5.

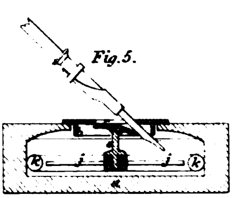
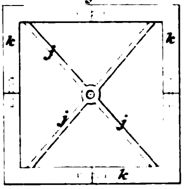


Fig 6.



Croll's imp^{d} gas meter.

Fig. 1.

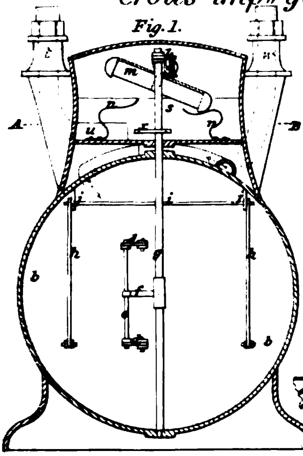


Fig. 2.

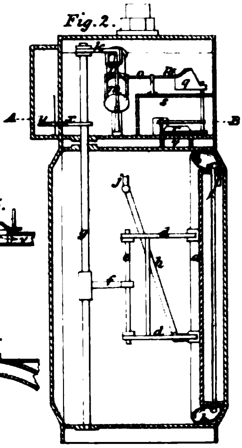


Fig. 5.

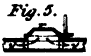


Fig. 6.

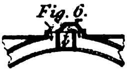


Fig. 4.

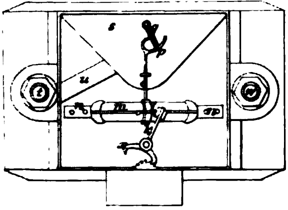
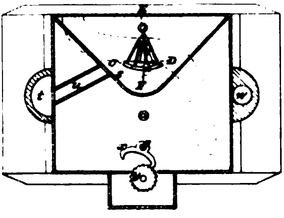


Fig. 3.



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